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FROM THE EDITOR IN CHIEF

As the Board of Directors of Turkish Geriatrics Society, we would like to inform you to reflect on the progress we have in the Turkish Geriatrics Society's activities during 2018.

Turkish Journal of Geriatrics 20th year celebration ceremony was performed in 28th Feb, 2018 in Gordion Palace Hotel-Ankara.

http://geriatri.org.tr/public/files/Turkish_Journal_of_Geriatrics_20th_year_cerebration_ceremony.pdf.

We held a very successful 6th Geriatrics and Gerontology Course with the valuable support of International Institute on Ageing-INIA, in 7-11th May, 2018 in Neva Palace Hotel-Ankara.

http://geriatri.org.tr/public/file/Course_Report_6th_GERIATRICS_and_GERONTOLOGY_COURSE_in_Turkey.pdf.

Regarding the national courses; 10th Basic Geriatrics Course was based on the Nutrition of Elderly and was performed in Ankara Chamber of Medical Doctors education saloon in 22rd Sept, 2018.

http://www.turkgeriatri.org/haber_detay?id=69.

On the 1st of Oct, 2018 "International Elderly Day", a social dancing activity was organized with the residents in a nursing home in Ankara.

http://www.turkgeriatri.org/haber_detay?id=70.

On the 16th Oct, 2018 "World Spine Day", a multidisciplinary Ageing Spine Symposium was organized in Limak Ambassadore Hotel-Ankara.

<http://geriatri.org.tr/public/file/16-Ekim-2018-Web-icin.pdf>.

And it is a pleasure to announce that, further courses and activities aimed to inform and support young scientists and the public are being planned by the scientific board of the Society in 2019.

Prof. Yeşim GOKCE KUTSAL, M.D.
Editor in Chief



EDITORIAL

DO WE DISCUSS ETHICAL PROBLEMS REGARDING END-OF-LIFE CARE IN A PERSPECTIVE BROAD ENOUGH?

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When we consider the ethical problems related to end-of-life care, the first issue that usually comes to mind is euthanasia. Respect for autonomy, futile treatment, withdrawing/withholding treatment, and DNR could be added to the list. Yet the ethical problems at the end-of-life covers a vast area including a variety of topics, which is also deeper than it might seem. Lancet Commission on the Value of Death confirms that phenomenon by stating *"Society and medicine have an unhealthy relationship with death"* (1). The Commission defines the problems as global inequality in how people die, overtreatment, medicine's perception of death as a failure rather than normal, misallocation of resources, neglected spiritual needs, physicians' poor communication skills, lack of palliative care, and unnecessarily increasing costs. The three largest Anesthesiology and Reanimation specialty societies in Turkey identify a similar picture for Turkey as well (2-4). Along with the other topics such as ageism, opiophobia, and brain death, it is possible to compile those problems shown as Fig.1.

Access to healthcare needed <ul style="list-style-type: none">• Insufficient ICU units, palliative care, and healthcare workers• Unfair distribution of resources• Ageism	Death with dignity <ul style="list-style-type: none">• Inappropriate management of pain & symptoms• Opiophobia• Double-effect• Palliative care• Hospice• Euthanasia / Physician assisted dying
Determining the scope of healthcare/ limits of medicine <ul style="list-style-type: none">• Withholding treatment• Withdrawing treatment• DNR• Futile treatment• Overtreatment• Death as a failure	Brain death <ul style="list-style-type: none">• Determining brain death• Organ transplantation
Autonomy <ul style="list-style-type: none">• Determining competency• Telling the truth• Informing → Consent and refusal• Minors• Legal representatives / Proxy decision-makers• Advance directives	Healthcare-related harm <ul style="list-style-type: none">• Malpractice / complication• Defensive medicine
Confidentiality and privacy <ul style="list-style-type: none">• Respect to rights of personhood	Patient relatives <ul style="list-style-type: none">• Informing / Delivering bad news• Organ transplantation Scientific researches <ul style="list-style-type: none">• Respect to autonomy• Countering mortality rather than morbidity• Pursuing immortality

Figure 1. Ethically problematic issues regarding end-of-life care.

When we consider the mainstream current debates over ethical issues on end-of-life, it is possible to claim that those issues are held in a narrow scope which is limited to patient-physician relationships. For instance, euthanasia, together with withholding / withdrawing treatment, is one of the most frequent topic discussed by questions such as 'Should there be a right to have a physician's help to die?', 'Is there a duty for physicians to help patients who would like to die with ending their painful life in a terminal condition', 'In which conditions it is justifiable?'.

Related to this "neon" subject, medicine's failure to recognize death as natural is discussed only in the context of medicine's nature. Elements of a "good death" are "effective pain and symptom management", "at home, surrounded by family and friends", "in a manner that resonates with the person's individuality", with "open acknowledgment of the imminence of death", and an awareness "in which personal conflicts and unfinished business are resolved" (5, 6). On the other hand, "dying (...) has become medicine's enemy, distorted from a natural event of social and cultural significance, into the endpoint of untreatable or inadequately treated disease or injury, serving as a reminder of the limitations of medicine" (7), therefore "Diagnosing dying is an important clinical skill" (8). Medicalization of dying has reached a level so high that F. Nauck defined it as "something akin to an industrial accident" (5). This phenomenon is partly rooted in the very nature of medicine, and the traditional medical education accordingly, which equalise 'patient's best interest' to 'medical beneficence' without taking into consideration patients' preferences. It is also true that hesitating in withholding or withdrawing treatment and applying futile treatments are related to the concerns of violence towards healthcare workers and lawsuits against them. Yet the issue is more fuzzy, surrounded by various determinants beyond the patient-physician relationship.

Approaches to ageism is another example for the similar problem. I use a case scenario in my class with medical students in order to make them aware how easily they might discriminate among their patients

based on their ages. In the scenario students need to choose one patient among four to allocate a rare vital resource (i.e. an organ to transplant), they usually try to choose between a child and a young person while eliminating Mr. Ahmet without even discussing, who is 67, a retired primary school teacher living alone with his birds. This preference never changes throughout the years I have been giving the class. Some argue that their rationale is based on solely medical justifications, yet the majority of students defend that elder people are "done / had enough", assuming that younger people have productive years ahead so they should be prioritized. The case creates a good opportunity to discuss why protecting the non-discrimination principle in the medical profession is a must, as it was strongly stated in the Physician's Oath: "I will not permit considerations of age, (...) to intervene between my duty and my patient" (9). What the students are not aware is that they are not only discriminating based on age, but also ignoring the social determinants of health, and -at least implicitly- prioritizing an economic dimension, while making choices upon the value of life.

As those issues exemplify, the ethical problems regarding end-of-life care are discussed in a narrow perspective limited to patient-physician relationship on the micro level. However, those issues which create moral tensions for patients and physicians are shaped under the heavy influence of a utilitarian approach and social determinants of health. Today healthcare services are provided by the measure of ability to pay, cost-effectivity, DALY&QALY, and profitability. Reimbursement policies are limited to a basic package which is justified by the discourse of "limitedness of resources", while availability and accessibility of services are diminishing. Those macro policies create an extra burden for elderly people who are already discriminated against by ageism. Yet the effects of utilitarian policies in the end-of-life care, which is called "legitimizing the shameful" by M. Epstein (10), are rarely taken into consideration, despite the fact that they influence the emergence of ethical problems shown in Figure 1 directly or indirectly.

The UN calls upon Member States “to address the well-being and adequate health care of older persons, (...) by designing more effective prevention strategies and stronger laws and policies to address these problems and their underlying factor” (11), and identifies challenges as “the affordability of care, the availability of services and the need to take a more human rights-based approach to long-term and palliative care” (12).

If we genuinely intend to improve the ethically problematic issues related to end-of-life care, then policies based on cost effectivity should be replaced by a rights-based approach prioritizing availability and accessibility, while considering social determinants of health. Adopting Geriatrics’ approach, which focus on the specific needs of the elderly, will definitely provide guidance in this endeavor.

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RESEARCH

PROGNOSTIC VALUE OF HEMATOLOGICAL PARAMETERS IN GERIATRIC PATIENTS HOSPITALIZED IN INTENSIVE CARE UNITS

ABSTRACT

Introduction: The aged bone marrow has a reduced proliferation ability in response to acute clinical status such as intensive care hospitalization. The presence of malnutrition, multiple chronic diseases, and comorbid conditions and the use of multiple pharmacological agents have an impact on the results of hematological tests. In this study, we aimed to determine the possible associations between complete blood counts and the prognosis and mortality of patients admitted to intensive care units.

Materials and Method: We retrospectively examined data of patients admitted to the intensive care unit between January 2014 and January 2016. We extracted complete blood count results and compared them based on age and mortality groups.

Results: We analyzed the data of 810 patients (548 geriatric and 262 non-geriatric patients). The overall mortality rate was 31.97%; this was higher in geriatric than in non-geriatric patients ($p=0.01$). We found the mean white blood cell counts in non-geriatric patients and the mean hemoglobin and hematocrit values and platelet counts in geriatric patients to be significantly lower than those in their counterparts ($p=0.05$, $p=0.01$, $p=0.02$, and $p=0.05$, respectively). While the mean hemoglobin and hematocrit values significantly lower in mortality group in both age populations, the mean platelet decrease was observed as a significant factor only in geriatric patients in terms of mortality ($p=0.01$, $p=0.04$ and $p=0.01$ respectively).

Conclusion: Close monitoring of hematological parameters, especially platelet counts in geriatric patients, and providing the necessary treatment will aid in a positive prognosis for patients in intensive care units.

Keywords: Hematological tests; Blood Cell Count; Geriatrics; Intensive care unit; Prognosis

ARAŞTIRMA

HEMATOLOJİK PARAMETRELERİN YOĞUN BAKIM ÜNİTESİNDE YATAN GERİATRİ YAŞ GRUBUNDAKİ HASTALARDAKİ PROGNOSTİK DEĞERİ

Öz

Giriş: Yaşlı kemik iliği, yoğun bakım hastanesi yatışı gibi akut klinik durumlara yanıt olarak azalmış bir proliferasyon kabiliyetine sahiptir. Malnütrisyon, çoklu kronik hastalıklar, komorbid durumlar ve çoklu farmakolojik ajanların kullanımı hematolojik testlerin sonuçları üzerinde etkilidir. Bu çalışmada, yoğun bakım ünitelerinde yatan hastaların tam kan sayımı ile prognoz ve mortalitesi arasındaki olası ilişkilerin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Ocak 2014-Ocak 2016 tarihleri arasında yoğun bakım ünitesine başvuran hastaların verileri retrospektif olarak incelendi. Tam kan sayımı sonuçları yaş ve mortalite gruplarına göre karşılaştırıldı.

Bulgular: 810 hastanın (548 geriatric yaş grubunda olan ve 262 geriatric yaş grubunda olmayan hasta) verilerini analiz ettik. Genel mortalite oranı %31.97 olup geriatric olgularda geriatric olmayanlara göre daha yüksekti ($p=0.01$). Geriatric yaş grubunda olmayan hastalarda ortalama beyaz kan hücreleri sayısı, geriatric yaş grubunda olan hastalarda ise ortalama hemoglobin, hematokrit değerleri ve trombosit sayıları anlamlı olarak düşüktü ($p=0.05$, $p=0.01$, $p=0.02$ sırasıyla). Ortalama hemoglobin ve hematokrit değerleri, hem geriatric yaş grubunda olan ve olmayan hastalarda mortalite grubunda anlamlı derecede düşüken ortalama trombosit sayısı sadece geriatric yaş grubunda olan hastalarda mortalite açısından belirleyici bulundu ($p=0.01$, $p=0.04$ ve $p=0.01$ sırasıyla).

Sonuç: Hematolojik parametrelerin, özellikle trombosit sayısının yakından izlenmesi ve gerekli tedavinin sağlanması yoğun bakım ünitelerinde yatan geriatric yaş grubunda olan hastalarda iyi prognoz sağlanmasına yardımcı olacaktır.

Anahtar sözcükler: Hematolojik test; Tam kan sayımı; Geriatric, Yoğun bakım ünitesi; Prognoz



INTRODUCTION

Developing health care services and increasing average life expectancies translate into increases in the geriatric population (1,2). Turkey's population if current trends continued in demographic indicators will continue to aging. In the year 2012, the population aged 65 years and over is 5.7 million people, 7,5% of the total population. In the last five years, it increased by 17,1% and became 6 million 651 thousand 503 elderly people in 2016. The proportion of the elderly population in the total population rose to 8.3% in 2016. By the year 2023, this population will increase to 8,6 million people and the rate will increase to 10,2% (3,4). This number is close to the total population of most European countries, and it is inevitable that individuals >65 years of age be designated as a separate patient group in terms of community health (1,2).

As well as hematological diseases, frequency of multiple chronic diseases also increases with aging. Hereby, geriatric patients represent many hospital admissions, particularly in the intensive care units (ICUs). In the geriatric patient group, wherein different comorbidities are frequent, changes in hematological parameters are also prominent and complete blood counts (CBCs) may vary widely, reflecting age-related comorbidities and treatment responses (1,5,6). The aged bone marrow appears to have a reduced proliferation ability in response to acute clinical status such as severe illness, pernicious infections, acute blood loss, intensive care hospitalization. In addition, problems such as malnutrition, multiple chronic diseases, pharmacological agent uses, and presence of malignancies can cause changes in hematological parameters in this patient group (5,6).

Considering aging as a known risk factor for mortality and the increasing number of geriatric

ICU admissions, we focused on evaluating hematological parameters in geriatric ICU patients. We aimed to reveal CBC result variability in ICU admissions according to age groups and to identify possible prognostic roles of the results in patients admitted to ICUs.

MATERIALS AND METHOD

We retrospectively examined data from patients hospitalized in the ICU of Internal Medicine Clinic between January 2014 and January 2016. The University Ethics Committee approved the study. We compiled demographic data, CBC results [white blood cell (WBC) and platelet counts and hemoglobin and hematocrit values] obtained upon ICU admission, ICU stay durations, additional clinical conditions, intubation status and mortalities during the patients' ICU stay. We classified data from patients aged ≥ 65 years into the geriatric patient group, and those of patients aged < 65 years into the non-geriatric patient group.

While the patients who were discharged from ICU were defined as "survival group", patients who died in ICU were defined as "death group". Statistical analyzes were performed among the identified groups. SPSS software (SPSS Inc, Chicago, IL) was used for statistical evaluation. In descriptive statistics, frequencies and percentages for discrete data, and means \pm standard deviations for continuous variables were used. The normality of the continuous variables was analyzed with the Kolmogorov-Smirnov test. Mean values with parametric distribution between groups were analyzed by Student's T test and ANOVA. Mean values with non-parametric distributions were compared by Mann-Whitney U and Kruskal-Wallis tests. Probability (p) values less than 0.05 were considered statistically significant.

RESULTS

A total of 810 patients in the two groups, 548 geriatric patients and 262 non-geriatric patients, were hospitalized in the aforementioned ICU. Of these, 350 were women and 460 were men. Their mean age was 65.17 ± 17.32 . Further, 67.65% of all patients were part of geriatric patient group, and 32.3% were part of the non-geriatric patient group.

General comparison between geriatric and non-geriatric patient groups

The mean age was 75.21 ± 10.11 in geriatrics and 44.16 ± 17.38 in non-geriatrics. APACHE II score, intubation frequency and mean ICU stay time were significantly higher in geriatric patients ($p=0.01$, $p=0.001$ and $p=0.003$ respectively). The mean WBC counts in non-geriatric patient group and the mean hemoglobin, hematocrit and platelet counts in geriatric patient group were significantly lower than those in their counterparts ($p=0.05$, $p=0.01$, $p=0.02$, and $p=0.05$, respectively) (Table 1). The mean ICU stay duration was 15.67 ± 8.95 days in non-geriatric patients group and 23.43 ± 14.42 days in geriatric patient group with a statistically significant difference ($p=0.03$). The overall mortality rate was 31.97% (35.40% in the geriatric patient group, 24.81% in the non-geriatric patient group) and the difference between patient groups was statistically significant ($p=0.01$). The clinical and laboratory findings of the two groups are summarized in Table 1.

Comparison between geriatric and non-geriatric patient groups requiring intubation

Of the 630 patients who required intubation by invasive mechanical ventilation, 462 were

geriatric patients (84.30%) and 168 were non-geriatric patients (64.12%). Intubation frequency was significantly higher in geriatric patients ($p=0.02$). APACHE II score, mean ICU stay time and mean ventilator days were significantly higher in geriatric patients ($p=0.03$, $p=0.02$ and $p=0.01$ respectively). The mean hemoglobin and hematocrit values and platelet counts were significantly lower ($p=0.01$, $p=0.01$, $p=0.04$, respectively) in the intubated geriatric patient group than in the intubated non-geriatric patient group. The mortality rate in the intubated geriatric patient group was significantly higher (40.04%) than in the intubated non-geriatric patient group ($p=0.01$) (Table 2).

Comparison between survival and mortality groups

Of the 810 patients followed in ICU for 2 years, 551 were discharged from ICU, and 259 died during their stay. The overall mortality rate was 31.97%; it was higher in geriatric patients. When CBC data were analyzed, low mean hemoglobin and hematocrit values and platelet counts were more frequent in patients who died than in those who were discharged ($p=0.02$, $p=0.01$, and $p=0.05$, respectively) (Table 3). When mortality groups were evaluated as subgroups according to age, there were different as well as common mortality risk factors between geriatric and non-geriatric cases. While the mean hemoglobin and hematocrit values significantly lower in mortality group in both age populations, the mean platelet decrease was observed as a significant factor only in geriatric patients in terms of mortality ($p=0.01$, $p=0.04$ and $p=0.01$ respectively).



Table 1. Comparison of clinical findings of patients according to age groups.

Characteristics		Non-geriatric patient group n (%)	Geriatric patient group n (%)	p
			262 (32.35%)	
Sex (n, %)	Female	117(44.66%)	233 (42.52%)	NS
	Male	145 (55.34%)	315 (57.48%)	NS
Mean age (year)		44.16±17.38	75.21±10.11	-
APACHE II		15.34±5.45	22.56±6.32	0.01
Intubation (n, %)		168 (64.12%)	462 (84.31%)	0.001
Mean ICU stay (days)		11.67±8.95	23.43±14.42	0.03
Mortality		24.81 %	35.40 %	0.01
Mean WBC ($\times 10^3$ cell/ μ L)		8.650±2.560	12.350±4.130	0.05
Mean hemoglobin (g/L)		11.3±4.1	9.7±3.2	0.01
Mean hematocrit (%)		34.2±6.7	28.6±7.6	0.02
Mean platelet ($\times 10^3$ cell/ μ L)		213.000±95.000	186.000±113.000	0.05

NS, not significant; WBC, white blood cell; ICU, intensive care unit

Table 2. Comparison of clinical findings between intubated non-geriatric patient and intubated geriatric patient groups.

Characteristics		Intubated non-geriatric patients	Intubated geriatric patients	p
n,%		168 (64.12%)	462 (84.31%)	0.02
Sex (n, %)	Female	92 (54.76%)	194 (41.99%)	NS
	Male	76 (45.24%)	268 (58.01%)	NS
Mean age (year)		55.11±14.58	76.01±10.15	-
APACHE II		19.33±6.15	24.28±6.85	0.03
Mean ICU stay (days)		15.74±6.81	24.36±13.456	0.02
Mean ventilator days		7.78±2.34	17.62±8.9	0.01
Mean ventilator-free days		7.96±2.12	6.74±1.9	NS
Mortality		22.62 %	40.04 %	0.001
Mean WBC ($\times 10^3$ cell/ μ L)		9.150±2.320	12.150±5.450	0.05
Mean hemoglobin (g/L)		11.7±3.9	8.6±2.1	0.01
Mean hematocrit (%)		33.1±6.3	26.3±5.7	0.01
Mean platelet ($\times 10^3$ cell/ μ L)		205.000±110.000	177.000±98.000	0.04

NS, not significant; WBC, white blood cell; ICU, intensive care unit

Table 3. Comparison of general clinical findings of survival and mortality groups.

Characteristics	Survival group	Mortality group	p
n (%)	551 (68.02%)	259 (31.97%)	-
Age (years)	60.39±12.76	75.45±11.32	0.05
Mean WBC (× 10 ³ cell/μL)	8.330±3.230	14.547±6.780	NS
Mean hemoglobin (g/L)	12.1±3.5	8.6±2.8	0.02
Mean hematocrit (%)	34.3±7.4	25.7±4.6	0.01
Mean platelet (× 10 ³ cell/μL)	220.000±85.300	164.370±94.200	0.05
IMV	36 (5.71%)	223 (35.39%)	0.001
Mean ICU stay (days)	11.31±8.92	23.12±11.35	0.01

NS: not significant; WBC: white blood cell, IMV: invasive mechanical ventilation

DISCUSSION

The rapid increase in geriatric population results in the emergence of this patient group in intensive care units. Therefore, intensive care data of geriatric patients are privileged in predicting their prognosis and mortality. From this point of view, in this study we evaluated the effects of hematological parameters on prognosis by examining the intensive care data of geriatric patients. 548 geriatric and 262 non-geriatric patients were included in the study and the mortality rate was significantly higher in geriatric patients ($p=0.01$). There was also a significant difference between the groups in terms of hematological parameters. The mean white blood cell (WBC) counts in non-geriatric patients and the mean hemoglobin and hematocrit values and platelet counts in geriatric patients to be significantly lower than those in their counterparts ($p=0.05$, $p=0.01$, $p=0.02$, and $p=0.05$, respectively). While low hemoglobin and hematocrit values were significant in mortality group in both age populations, a low mean platelet count was a significant determinant of mortality in only geriatric patients ($p=0.01$, $p=0.04$ and $p=0.01$ respectively).

It is well known that hemopoietic system undergoes significant age-associated functional changes. However, the functional mechanisms of this situation are still controversial. Data from

animal models have suggested that an expansion of defective stem and progenitor cells may occur in the aging bone marrow. In an ancient study which is one of pioneers in animal studies, replicative capacity of hemopoietic stem cells was found to progressively decline upon serial transplantation in mouse models and it was interpreted as these cells may become exhausted with age (7). It has been demonstrated by several investigations that by age of 70 years, the hemopoietic cellularity of bone marrow is reduced to about 30% of that of young adults (8). On the other hand, the current opinion about the aging hemopoietic system is that age-related modifications of bone marrow are not reflected in the hemogram in healthy elderly people. These changes, however, may become clinically evident under conditions of severe hemopoietic stress such as severe illness, intensive care hospitalization. (9-11).

Some ICU stay data of geriatric patients and data regarding age-related mortality rates and hemogram parameters are available in the current literature (12-15). In our ICU, we have our own research results in this area. In our study of 135 acute respiratory distress syndrome cases, we found mortality rates to be higher in geriatric patients. In another retrospective study of our ICU, advanced age was identified as a risk factor for ventilator-associated pneumonia (16).



Studies on the effects of hematological and biochemical parameters on prognosis and mortality are also available (17,18). Low albumin and high creatinine levels have been identified as mortality risk factors in geriatric patients (18). In a study conducted by Ponzetto et al. in geriatric patients, serum albumin, fibrinogen, and creatinine levels were identified as independent risk factors for mortality (19). Similar to our results, in another study, low serum albumin and hemoglobin levels were associated with mortality in geriatric patients (12). In the study of Fontana et al., erythrocyte sedimentation rate, C-reactive protein level, insulin-like growth factor level, triiodothyronine level, serum albumin level, iron level, total cholesterol level, and low-density lipoprotein cholesterol level together with WBC and lymphocyte counts were associated with mortality in geriatric patients in accordance with our findings in terms of WBC (20). Studies have also shown that the red blood cell distribution width and serum vitamin B12 levels may predict mortality in geriatric inpatient populations (21-23).

In the study of Frąckiewicz et al. several hematological parameters were found to be inversely associated with a risk of all-cause mortality among men, but not among women in older people (24). Whereas, they found no similar associations for red blood cell, hemoglobin and hematocrit levels. This finding was interpreted as a result of a difference

in iron metabolism between genders. However, our results did not differ significantly between the genders.

Despite all our literature searches, we could not find sufficient data on the association between hematological test results and the prognosis of geriatric patients in intensive care units. In this respect, we think that the results obtained in our study will help clinicians.

As a conclusion, the aged bone marrow has a reduced proliferation ability in response to severe clinical status such as intensive care hospitalization. It makes the result inevitable that hematological parameters of patients in ICU show significant differences between geriatric and non-geriatric patient groups. Careful monitoring of the hematological data in geriatric patients and appropriate blood product transfusion such as platelet replacement treatments when needed will improve their prognosis.

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Conflicts of interest

The authors of this article state that they have no conflict of interest.

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RESEARCH

THE RELATIONSHIP BETWEEN C REACTIVE PROTEIN /ALBUMIN RATIO AND 1-YEAR MORTALITY IN HOSPITALIZED ELDERLY COPD PATIENTS WITH ACUTE EXACERBATION

ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) is a leading cause of mortality. C-reactive protein (CRP) is often elevated with acute infective and inflammatory situations. Hypoalbuminemia may be linked to chronic diseases and malnutrition. Here, we investigated the relationship between 1-year mortality and CRP/albumin ratio (CAR) among hospitalized elderly patients with COPD acute exacerbation.

Materials and method: The records of patients who were hospitalized with COPD diagnosis in the internal medicine and chest diseases clinics of Kafkas University Medical Faculty Hospital between January 2014 and May 2017 were retrospectively evaluated to determine whether selected patients had died within 1 year of hospitalization. The patients who died (Group 1) and those who were living (Group 2) were compared in terms of various parameters, especially CAR.

Results: In Group 1, CRP levels were high and albumin levels were significantly lower; the CAR ratio in group 1 was 0.36 (0.29–0.64), which was significantly elevated, compared with that of Group 2 (0.09; 0.03–0.27). In the multivariate analysis, independent predictors of 1-year mortality were CAR [1.116 (1.025–1.216), p=0.011], smoking (packs/year) [1.135 (1.082–1.190), p<0.05], pH [0.001 (0–0.14)], BODE index [1.693 (1.157–2.478)], and FEV1/FVC [0.911 (0.846–0.980)]. Area under the curve values of CAR for 1-year mortality were significantly higher than the values of both albumin and CRP alone (p<0.05).

Conclusion: The CRP/albumin ratio is an independent predictor of 1-year mortality in patients with COPD. More comprehensive prospective studies are needed to confirm this finding.

Keywords: C-Reactive protein; Serum Albumin, Pulmonary Disease, Chronic Obstructive, C-Reactive Protein/analysis

ARAŞTIRMA

AKUT KOAH ATAĞI İLE HASTANESİNE YATIRILAN YAŞLI HASTALARDA 1 YIL MORTALİTE İLE C REAKTİF PROTEİN/ALBUMİN ORANI ARASINDAKİ İLİŞKİNİN DEĞERLENDİRİLMESİ

Öz

Giriş: Kronik obstruktif akciğer hastalığı (KOAH) mortalitenin önde gelen bir nedenidir. C reaktif protein (CRP) genellikle akut enfektif ve enflamatuar durumlarda artış gösterir. Hipoalbuminemi kronik hastalıklar ve malnutrisyon ile ilişkili olabilmektedir. Bu çalışmada KOAH akut atak ile hastaneye yatırılan yaşlı hastalarda CRP/albumin oranı (CAO) ile 1 yıllık mortalite arasındaki ilişki araştırılmıştır.

Gereç ve Yöntem: Ocak 2014-Mayıs 2017 tarihleri arasında Kafkas Üniversitesi Tıp Fakültesi iç hastalıkları ve göğüs hastalıkları kliniklerinde KOAH atak ile yatırılan hastaların kayıtları retrospektif olarak hastane yatışının ilk 1 yılı içerisinde hayatta olup olmadıkları araştırılarak değerlendirildi. Ölen hastalar grup 1, sağ kalan hastalar grup 2 olarak ayrıldı ve başta CAO olmak üzere parametreler karşılaştırıldı.

Bulgular: Grup 1'de CRP seviyesi yüksek, albümin seviyesi anlamlı olarak düşüktü ve CAO Grup 1'de 0.36 (0.29-0.64) olup Grup 2'den 0,09 (0.03-0.27) anlamlı olarak daha yüksekti. Yapılan multivariyent analizde 1 yıllık mortalitenin bağımsız prediktörleri CAO [1.116(1.025-1.216) p=0.011], sigara içimi (paket/yıl) [1.135 (1.082-1.190) p<0.05], pH [0.001(0-0.14)], BODE [1.693 (1.157-2.478)], FEV1/FVC [0.911(0.846-0.980)] olarak bulundu. Bir yıllık mortalite için CAO'nun AUC değerleri hem albümin hem de CRP'nin tek başına olan değerlerinden anlamlı yüksekti(P<0.05).

Sonuç: CRP/albumin oranı KOAH'lı hastalarda 1 yıllık mortalitenin bağımsız bir prediktördür. Bu bulgunun doğrulanması için daha kapsamlı prospektif çalışmaların planlanması gereklidir.

Anahtar sözcükler: C reaktif protein; Kronik Obstruktif Akciğer Hastalığı; C reaktif protein/albumin oranı

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a frequent disease characterized by persistent respiratory symptoms and airway limitation. COPD is a leading cause of morbidity and mortality worldwide, as reported by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2018 (1). According to World Health Organization (WHO) data, more than 65 million people had moderate and severe COPD in 2005; additionally, more than 3 million deaths were caused by COPD (2). Acute exacerbation of COPD is often associated with deterioration of respiratory symptoms and requires hospitalization, which is an important contributor to the mortality of COPD patients. Individual risk assessment in patients admitted to the hospital may be especially useful in terms of prognosis. The presence of links among biomarkers is frequently referenced during admission and prognosis may be useful in determining high-risk patients.

Chronic obstructive pulmonary disease is a multifactorial disease. Modifiable risk factors (e.g., smoking, occupational exposure, and air pollution) as well as non-changeable risk factors (e.g., aging and bronchial hyperreactivity) play roles in the etiology of COPD. Smoking is the most important risk factor. Mucus accumulation, bronchial fibrosis, and local inflammation associated with these risk factors cause permanent damage to the lungs. Patients with COPD often exhibit low-grade systemic inflammation. This condition is evidenced by changes in tumor necrosis factor (TNF) alpha, Interleukin (IL)-6, and C-reactive protein (CRP) levels and the presence of leukocytosis in patients. Systemic inflammation plays an important role in the pathogenesis of COPD, disease progression, and mortality (3).

C-reactive protein is an acute phase protein and is widely used in the clinical evaluation of patients. In addition to CRP, serum albumin levels may also be important in prognosis as a negative acute phase reactant whose level is negatively correlated with the severity of the inflammatory response induced by infection in critically ill patients. Therefore, serum albumin may decrease, whereas CRP may increase, during acute exacerbation of COPD. CRP/albumin

ratio (CAR) is positively correlated with infection, as high rates indicate more severe inflammation. Previous studies have shown an association between 90-day mortality and CAR in patients with sepsis. However, no such studies have been performed in patients with COPD. We investigated whether there is a relationship between CAR during hospitalization and 1-year mortality in patients hospitalized for acute exacerbation of COPD.

MATERIALS AND METHOD

The records of patients who were admitted to the internal medicine, emergency and chest diseases clinics of Kafkas University Medical Faculty Hospital and hospitalized with COPD diagnosis, during the period between January 2014 and May 2017, were retrospectively evaluated. For this purpose, the hospital database was primarily used to identify patients who were hospitalized for COPD. The following characteristics of the patients were evaluated: age, gender, duration of disease, smoking status (smokers who smoking currently and those who smoked before were treated as smokers and those who never smoked were considered non-smokers and the amount of cigarettes they smoked was calculated as package/year), comorbid diseases, patient's history of invasive and/or noninvasive mechanical ventilation requirement, BODE index calculated accordingly (4), duration of hospitalization, physical examination at admission, laboratory data (complete blood count(CBC), CRP, CAR, and biochemistry) arterial blood gas, posteroanterior chest radiograph, and echocardiography on admission. The 6-minute walk test and respiratory function test results recorded at the time of the most recent hospitalization. The frequencies of admission to hospital and emergency department were searched, new hospitalizations were identified for patients. All patients who died within 1 year after hospitalization were recorded. For the diagnosis of COPD, post-bronchodilator respiratory function test result was required to be below 70%. Patients with any of the following conditions were excluded from the study: need for intensive care, incompatible respiratory function test, pneumonic infiltrates on



chest X-ray, decompensated heart failure, additional disease disrupting the general condition. Patients with missing data in any of the parameters were excluded from the study. We investigated whether the parameters that could predict mortality, particularly CAR, were significantly different between the group with 1-year mortality (Group 1) and the group in which patients remained living at the end of 1 year (Group 2).

Statistical analysis

Statistical analyses were performed using the MedCalc and SPSS 22.0. Normality of the data was analyzed using the Kolmogorov–Smirnov test. Continuous variables with normal distribution are expressed as mean (\pm standard deviation) values and were compared using the independent t-test. Continuous data without normal distribution were presented as median interquartile ranges (25–75 percentiles) values and were compared using the Mann–Whitney U test. Categorical variables are expressed percentages and were compared using Fisher’s exact test or the χ^2 -test. The risk factors for 1-year all-cause mortality were analyzed using multivariate Cox proportional hazard analysis was performed with variables that showed statistically significant associations with mortality in the univariate analyses. Multicollinearity between CAR and its components (CRP and albumin) was assessed by Eigen value and condition index. Linearity was tested by interacting with the logarithmic transformation of each parameter itself. The receiver operating characteristic (ROC) curve was utilized to derive the best cut-off values of the CAR for predicting all-cause mortality. The method proposed by DeLong et al. was then used to compare the ROC curves of CAR, CRP, albumin, and NLR for predicting all-cause mortality. p values <0.05 were considered statistically significant.

RESULTS

In total, 1592 patients who were hospitalized with COPD were evaluated retrospectively. Two hundred thirty-two patients were excluded from the study because they were admitted directly to the intensive care unit; 94 patients did not have respiratory function test results appropriate for COPD, 523 of the patients

respiratory function test results were missing, so these patients were excluded. 109 patients were not included in the study because of obvious pneumonic infiltration on chest X-ray, 41 patients did not include in the study because of the presence of decompensated heart failure and uncontrolled diabetes mellitus; 310 patients with missing at least one of the following parameters were missing: laboratory results, patient history and physical examination were excluded from the study. The remaining 283 patients who met all the criteria were included in the study. Sixty-three of these patients died within 1 year after hospitalization. The study flowchart is shown in Figure 1.

The mean age for all cases was 70.83 ± 8.96 years; this was not significantly different between the two groups ($p > 0.05$). In total, 152 of the patients were male (53%); 131 of them were female (47%). There was no significant difference between the two groups in by gender ($p = 0.392$).

The proportion of comorbid diseases were similar between groups 1 and 2 consisting hypertension, diabetes and coronary artery disease. Smoking rates were similar, but packs/year of smoking in group 1 was significantly longer than group 2 ($p < 0.01$). Pulse rate and blood pressure level were similar, left ventricular systolic functions at the time of echocardiography were also similar ($p > 0.05$). Initial respiratory rate was significantly higher in group 1 ($p < 0.05$), whereas oxygen saturation was lower in group 1 ($p < 0.01$).

White blood cells (WBCs), creatinine, lactate dehydrogenase (LDH), and $p\text{CO}_2$ were significantly higher in Group 1; hemoglobin and total protein ($p < 0.05$), as well as pH, $p\text{O}_2$, and FEV1/FVC ratio ($p < 0.01$ for all three) were significantly lower.

The rate of re-hospitalization within 1 year was higher in Group 2 ($p > 0.05$). Body mass index was significantly lower in Group 1 and the duration of hospitalization was significantly longer ($p < 0.01$).

In Group 1, the ratio of patients who had MMRC dyspnea score 3-4 was higher than that in group 2, but not statistically significant ($p > 0.05$). Six-minute walking test results were significantly lower in group 1, whereas BODE index was significantly higher ($p < 0.01$).

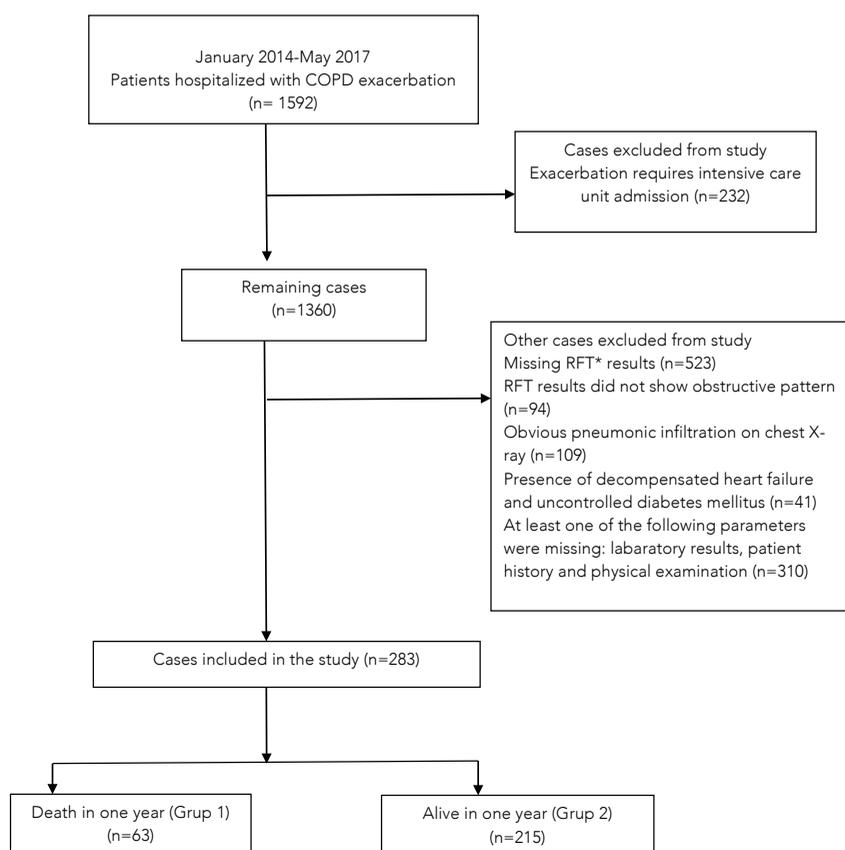
In Group 1, CRP levels were higher, whereas albumin levels were significantly lower ($p < 0.05$). CAR was 0.36 (0.29–0.64) and 0.09 (0.03–0.27) in groups 1 and 2, respectively; Group 1 had significantly higher CAR levels than those of group 2 (Table 1) ($p < 0.01$).

To identify the independent predictors of 1-year mortality, multivariate cox regression analyses with a stepwise backward model were performed using the variables that showed marginal association with 1-year mortality in the univariate analyses; these variables included.

In the multivariate analysis, independent predictors of 1-year mortality were: cigarette smoking time (packs/year) [1.135 (1.082–1.190), $p < 0.001$], pH [0.001 (0–0.14), $p < 0.001$], BODE [1.693 (1.157–2.478),

$p = 0.007$], FEV1/FVC [0.911 (0.846–0.980), $p = 0.013$], and CAR [1.116 (1.025–1.216), $p = 0.011$] (Table 2).

Receiver operating characteristic curve results of 1-year mortality were as follows: for CAR (area under the curve (AUC) 0.639, 95% CI 0.569–0.709), for CRP (AUC 0.599, 95% CI 0.524–0.675), and for albumin (AUC 0.593, 95% CI 0.514–0.673) (Figure 2). The AUC value of CAR was significantly higher than that of either albumin or CRP alone ($p < 0.05$). Its sensitivity for predicting death was 64.71%, while its specificity was 59.53% with the measured CAR cut-off value (0.639). BODE index (AUC 0.678, 95% CI 0.619–0.733), which has been identified as a successful index in predicting mortality in COPD, did not have a statistically significant advantage over CAR (AUC 0.639, 95% CI 0.569–0.709) ($p > 0.05$).



*RFT: Respiratory function test

Figure 1. Retrospective study patient inclusion procedure (study flow chart).



Table 1. Comparison of all parameters between living and deceased groups.

Characteristics	All-Cause mortality						p	
	All patients (n:283)		Survived patients (n:215)		Non-surviving (n:63)			
Age (year)	70.8	±9.0	70.7	±9.2	71.2	±8.3	0.810	
Female gender. n (%)	131	(47.0)	96	(45.5)	35	(51.5)	0.392	
Hypertension. n (%)	133	(47.0)	98	(45.6)	35	(51.5)	0.397	
Diabetes n (%)	59	(20.8)	43	(20.0)	16	(23.5)	0.533	
CAD (%)	64	(22.6)	46	(21.4)	18	(26.5)	0.384	
Smoking n (%)	37	(13.1)	28	(13.0)	9	(13.2)	0.964	
Pack/year of smoking	22	±7.7	20	±7.0	30	±4.9	<0.001	
Re-hospitalization in 1 year n (%)	203	(71.7)	158	(73.5)	45	(66.2)	0.244	
SBP Hg (mm Hg)	119.7	±12.5	119.2	±11.0	121.1	±16.5	0.571	
Heart rate (bpm)	85.0	±41.3	82.6	±13.0	92.7	±81.4	0.796	
Respiration Rate (per min)	20.6	±8.4	20.0	±6.1	22.6	±13.0	0.054	
Saturation (%)	90.5	±7.6	91.4	±6.1	87.3	±10.7	<0.001	
WBC (/1000)	8.7	±5.6	8.3	±5.5	9.9	±5.5	0.002	
Neutrophil (/1000)	7.3	±4.0	7.4	±4.1	7.1	±3.6	0.872	
Hemoglobin (g/dL)	13.4	±2.8	13.6	±2.6	12.7	±3.1	0.040	
Platelet (/1000)	237	176-309	241	184-303	227	148-316	0.206	
Glucose (mg/dL)	121	100-163	120	100-159	121	103-170	0.611	
Creatinine (mg/dL)	1.0	0.7-1.5	1.0	0.7-1.4	1.1	0.8-1.8	0.051	
LDH (U/L)	243	202-325	239	199-305	278	223-463	<0.001	
CRP (mg/dL)	3.8	1.2-9.0	3.2	1.0-8.3	6.4	1.9-11.2	0.013	
Albumin (gr/dL)	3.6	±0.6	3.6	±0.5	3.4	±0.6	0.020	
CAR	0.2	0.03-0.32	0.1	0.02-0.26	0.4	0.28-0.63	<0.001	
Total Protein (gr/dL)	6.9	±0.9	7.0	±0.9	6.6	±0.9	0.004	
pH	7.4	±0.1	7.4	±0.1	7.3	±0.1	<0.001	
PCO2 (mm Hg)	41.4	±12.3	39.9	±11.3	45.9	±14.0	<0.001	
PO2 (mm Hg)	56.4	±19.8	59.8	±18.1	45.6	±21.3	<0.001	
Duration of Hospitalization, day	6.8	±4.6	5.0	±2.4	7.0	±2.3	<0.001	
Intubation	13	±4.7	8	(3.8)	5	(7.6)	0.199	
Noninvasive Mechanical Ventilation	24	(8.6)	17	(8.0)	7	(10.6)	0.507	
Left Ventricular Ejection Fraction (%)	67.9	±6.3	67.9	±6.1	67.7	±7.3	0.747	
Ratio of FEV1 to FVC	54.7	±4.9	55.5	±4.3	52.0	±5.5	<0.001	
FEV1	1.6	1.0-2.5	1.8	1.1-2.5	1.5	0.8-2.4	0.063	
Percentage of Predicted FEV1	42.8	6.0	43.7	5.4	40.2	7.0	<0.001	
mMRC score	1.00	10	(3.5)	9	(4.2)	1	(1.5)	0.075
	2.00	42	(14.8)	34	(15.8)	8	(11.8)	
	3.00	213	(75.3)	161	(74.9)	52	(76.5)	
	4.00	18	(6.4)	11	(5.1)	7	(10.3)	
BMI (kg/m ²)	23.1	±1.2	23.6	±0.8	21.5	±0.8	<0.001	
Six Minutes Walking Test (m)	325.8	±41.2	335.6	±38.3	294.8	±34.0	<0.001	
BODE	4.8	±1.0	4.6	±1.0	5.3	±0.9	<0.001	

CAD: Coronary Artery Disease, SBP: Systolic Blood Pressure, WBC: White Blood Cell, LDH: Lactate Dehydrogenase, CRP: C-reactive protein, CAR: CRP/Albumin Ratio, FEV: Forced Expiratory Volume, FVC: Forced Vital Capacity, MMRC: modified Medical Research Council, BODE: Body-mass index, Airflow Obstruction, Dyspnea, and Exercise.

Table 2. Independent predictors of 1-year mortality in multivariate analysis.

Characteristics	Univariate analysis of predictors 1-year mortality			Multivariate analysis of predictors 1-year mortality		
	p	Hazard ratio	95% C.I.	p	Hazard ratio	95% C.I.
Smoking	<0.001	1.179	1.138-1.223	<0.001	1.135	1.082-1.190
Ph	<0.001	0.001	0.000-0.004	<0.001	0.001	0.000-0.014
FEV1/FVC	<0.001	0.871	0.830-0.915	0.013	0.911	0.846-0.980
BODE	<0.001	1.891	1.458-2.451	0.007	1.693	1.157-2.478
CRP/Albumin ratio	<0.001	1.132	1.022-1.254	0.011	1.116	1.025-1.216

FEV: Forced Expiratory Volume, FVC: Forced Vital Capacity, BODE: Body-mass index, Airflow Obstruction, Dyspnea, and Exercise, CRP: C-reactive protein

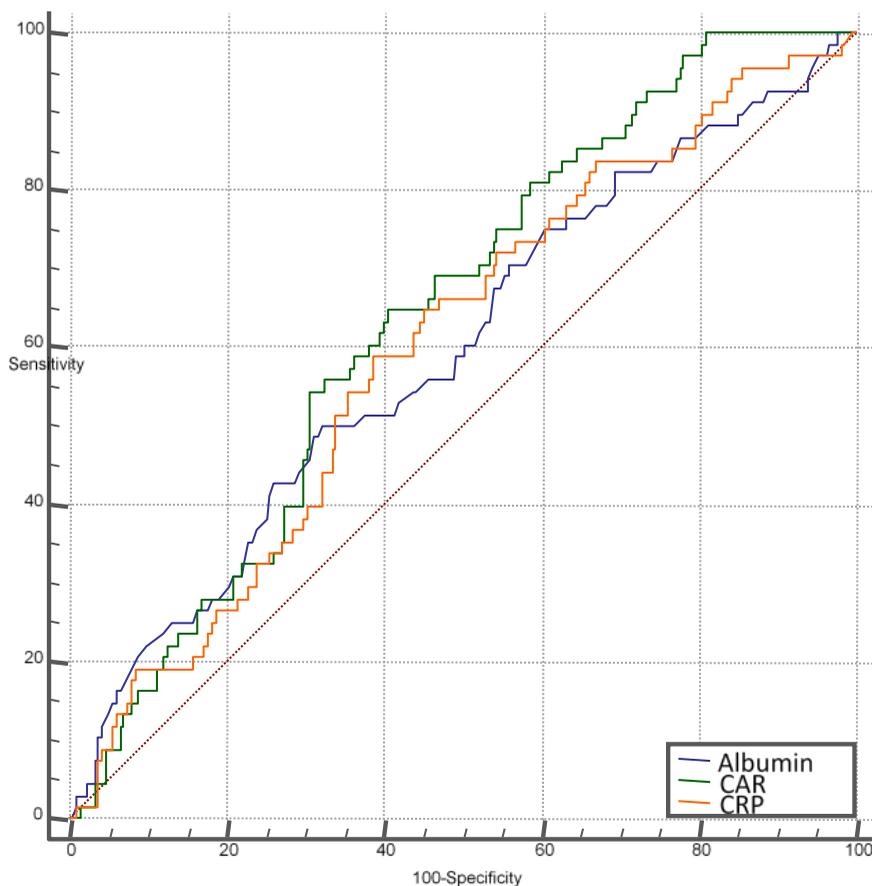


Figure 2. ROC curves of C-reactive protein (CRP), albumin, and CRP/Albumin Ratio.



DISCUSSION

Forced expiratory volume 1 is the most important indicator of the severity of airway obstruction, but its predictive value for mortality is poor. Because of the wide range in airway stenosis, it is better to predict mortality in COPD patients with other clinical variables that can be easily measured, compared with FEV1. MMRC dyspnea score, exercise capacity, and BMI are the most commonly used variables. In addition, it is increasingly common to predict mortality by means of with various biomarkers. Multicomponent methods are also used for this purpose (e.g., BODE index). Conflicting results have been reported regarding which of these methods are more valuable (4-6).

C-reactive protein elevation is a nonspecific indicator of systemic inflammation and is associated with an increased risk of mortality in patients with COPD (7). CRP is not an important predictor of death when evaluated with other predictors, such as BMI, expected FEV1, MMRC dyspnea score, 6-minute walking test, and BODE index in patients with moderate and severe COPD (8).

Ranzani et al. examined whether serum CRP and CAR as indicators of residual inflammation are risk factors for mortality during the intensive care unit discharge period and mortality within 90 days after intensive care unit discharge, among 334 patients who spent a minimum of 72 hours in the intensive care unit with diagnoses of sepsis and septic shock. They found serum CRP and CAR to be independent risk factors for mortality (9).

In our study showed that increased CAR was significantly correlated with 1 year mortality in hospitalized COPD patients. Smoking duration (packs/year), pH, FEV1/FVC ratio, and BODE index were important, in addition to CAR, as independent predictors of 1-year mortality, as shown by multivariate analyses.

In our study, ROC curve analysis was used to determine the cut-off value. For 1-year mortality, ROC curves were generated for CAR (0.639, 95% CI

0.569–0.709), CRP (0.599, 95% CI 0.524–0.675), and albumin (0.593, 95% CI 0.514–0.673). AUC values of CAR were significantly higher than those of both albumin and CRP alone. The sensitivity of death prediction was 64.71%; its specificity was 59.53% with the measured cut-off value of CAR (0.639).

Fairclough et al. evaluate emergency department admissions found a strong correlation between modified early warning score (MEWS) and CAR. The increase in CAR was less sensitive with respect to total mortality than MEWS, but was more valuable in the elderly, especially in cases of acute exacerbation of chronic disease (10).

There have been COPD studies in which only the CRP component of CAR is evaluated. At several studies both CAR parameters were investigated among patients who were admitted to the emergency department.

In our study, the average age of patients with COPD was 70 years, and the relationship between CAR and mortality (due to advanced age and acute exacerbation of chronic disease) was consistent with that identified by Fairclough, et al.

A meta-analysis in COPD patients showed that CRP elevation is especially significant in late mortality (11). High CRP and neutrophil levels, as well as low eosinophil levels have been shown to be poor prognostic factors (12). In our study, high CRP levels, reduced albumin levels and FEV1/FVC, as well as elevation of WBCs, were significant in group 1; notably, there was no significant difference for neutrophil count. Cachexia and reduction of muscle mass, which are systemic manifestations of COPD, were associated with increased mortality (13). Studies have shown that low BMI is a predictor of mortality in patients with COPD (14,15). In our study, BMI in Group 1 was significantly lower than that in group 2. While CRP increase is typically associated with acute infectious and inflammatory events, hypoalbuminemia is associated with chronic diseases. Moreover, it may be associated

with malnutrition. Therefore, CAR may have a higher predictive value than either CRP elevation or hypoalbuminemia alone. In our study, CAR was significantly higher than CRP or albumin levels alone.

Several parameters have been studied to determine prognosis in COPD patients. One of these is the BODE index. Marin et al. reported a significant correlation between BODE index and survival. It was found more valuable than FEV1 in predicting outcomes (15).

Exercise capacity is also an independent risk factor for predicting mortality in COPD. It was reported that severe predominantly male COPD patients exhibited progressive reduction of 6-minute walking distance; this reduction is independent from changes in FEV1. Therefore, the 6-minute walk test is a better predictor of mortality than FEV1 (16). In our study, an increased BODE index was an independent risk factor for prediction of mortality. Interestingly, our study sample did not have a predominantly male population. The prevalence of COPD in women has been attributed to the widespread biomass exposure of women in Kars.

Mortality in COPD was assessed by studies; there are reports suggesting parameters such as FEV1, IC/TLC, 6-minute walking test, maximum oxygen consumption, BMI, MMRC dyspnea score, BODE index, fibronectin/CRP ratio, echocardiography (17). In our study, low BMI and severe airway obstruction, as well as MMRC dyspnea score, were found to be significantly different between the deceased and the living group. The frequency of admission to the hospital did not differ between the two groups. This difference was attributed to the relatively low follow-up of the deceased group.

In our study, we found that oxygen partial pressure, oxygen saturation, and pH were significantly lower, while carbon dioxide and

obstruction were significantly higher in the deceased group. WBCs, creatinine, and LDH levels of the deceased group were also significantly higher, while hemoglobin, albumin, and total protein levels were significantly lower. We found that the deceased group had a higher packs/year tobacco consumption than the living group, and that the deceased group had longer hospitalization durations than the living group. Although the MMRC dyspnea score was higher in the deceased group, it was not significantly different. Similarly, there was no difference between the two groups in terms of the frequency of re-hospitalization.

In our study, cigarette use, low FEV1/FVC and BODE index, were independent predictors of mortality. These findings were consistent with current literature. Furthermore, in our study, CAR could be a more important marker of mortality rather than the CRP level. In the current literature, there is no similar study regarding patients with COPD. We have shown that 1-year mortality, estimated with CAR in COPD patients, can be more practical and can predict in a manner similar to that of the BODE index; however, the BODE index is more laborious and is not easy to perform in each patient. The main limitations of our study are as follows: the retrospective character of the study was the limiting aspect of our study. It should be supported by prospective studies. Our study consisted of data from single center. Moreover, for CRP and albumin, only the first laboratory values of the patient's hospital intake assessment were considered and the patients' exact causes of death were unknown.

In conclusion, we speculate that CAR may be an important predictor in determining the mortality of COPD, in combination with other parameters. With the help of randomized controlled, prospective, well-designed studies of this patient group, we believe that CAR can take its place in the clinical setting as a reliable prognostic marker.



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RESEARCH

TRANSITION TO HOME MECHANICAL VENTILATION FOR GERIATRIC PATIENTS WITH PROLONGED WEANING

ABSTRACT

Introduction: Demographic changes have resulted in increasing numbers of geriatric patients needing respiratory support in intensive care units. Conversely, these patients are faced with an increased risk of weaning failure and can be discharged with home mechanical ventilation. This study aimed to investigate the discharge status and home mechanical ventilator use of the elderly patients who experienced weaning failure.

Materials and Method: We retrospectively investigated the data of 51 patients older than 65 years who required home mechanical ventilator prescription due to delayed mechanical ventilation during their treatment in intensive care unit between January 2016 and January 2018.

Results: The patients' mean age was 78.33±8.12 years. Twenty-six patients (51%) switched to home mechanical ventilator, 12 weaned and 13 died before switching to home mechanical ventilator. Eleven patients (42.3%) were discharged with home mechanical ventilator and 15 (57.7%) were spontaneously breathing. Four patients were prescribed palliative care, 3 were sent home, 3 to a nursing home, 2 to the hospital ward and 14 to a secondary intensive care unit. After discharge, 9 patients were re-admitted to the intensive care unit and 12 of the 15 patients we contacted, died within 1 year.

Conclusion: Although the estimated mortality rate is high in geriatric patients in intensive care units, our study showed that the rate of discharge with a home mechanical ventilator was also high in these patients. Considering the prolonged length of stay in intensive care unit, we think that it is important to plan the discharge with a home mechanical ventilator in this patient group.

Keywords: Geriatrics; Ventilators; Mechanical; Weaning; Patient discharge

ARAŞTIRMA

MEKANİK VENTİLATÖRDEN AYRILMA SÜRECİ UZAMIŞ GERİATRİ YAŞ GRUBUNDAKİ HASTALARDA EV TİPİ VENTİLATÖRE GEÇİŞ

Öz

Giriş: Toplumdaki demografik değişiklikler ile geriatri yaş grubundaki hastalarda yoğun bakım yatışı ve solunum desteği ihtiyacı artmaktadır. Öte yandan bu hastalar mekanik ventilatörden ayrılamama riski ile karşı karşıyadır ve ev tipi ventilatör ile taburcu edilebilirler. Bu çalışmanın amacı yaşlı hastaların yoğun bakımdan taburculuk durumlarını ve ev tipi ventilatör kullanımlarını incelemektir.

Gereç ve Yöntem: Ocak 2016-Ocak 2018 tarihleri arasında yoğun bakımda tedavisi yapılan ve uzamış mekanik ventilasyon nedeniyle ev tipi ventilatör reçete edilen 65 yaş üstü 51 hastanın verileri retrospektif olarak incelendi.

Bulgular: Ortalama yaş 78.33±8.12 idi. Hastaların 26'sında (%51) ev tipi ventilatöre geçilirken; ev tipi ventilatöre geçilmeden önce 12 hasta mekanik ventilatörden ayrıldı, 13 hasta ise kaybedildi. Hastalardan 11'i (%42.3) ev tipi ventilatör ile, 15'i (%57.7) spontan solunum ile taburcu edildi. Dört hasta palyatif bakım ünitesine, 3 hasta eve, 3 hasta bakımevine, 2 hasta servise ve 14 hasta ise alt düzey yoğun bakıma ünitesine çıkarıldı. Taburculuk sonrası takiplerde 15 hasta yakınına ulaşılabildi; 9 hastanın tekrar yoğun bakım ünitesine yatırıldığı ve toplamda 12 hastanın ilk yıl içinde kaybedildiği öğrenildi.

Sonuç: Yoğun bakım ünitesindeki geriatrik hastalarda öngörülen mortalite oranı yüksek olmasına rağmen, çalışmanın sonuçlarında hastaların ev tipi ventilatör ile taburcu olma yüzdeleri de yüksek bulunmuştur. Bu hasta grubunda yoğun bakım yatışı sürelerinin uzun olduğu göz önüne alınarak, ev tipi mekanik ventilatör ile taburculuk planlanmasının önemli olduğu düşünülmektedir.

Anahtar sözcükler: Yaşlılık; Mekanik ventilatör; Ventilatörden ayırma; Hasta taburculuğu



INTRODUCTION

As populations age, the number of elderly patients in intensive care units (ICUs) needing respiratory support increases. With increasing age, the parenchymal and distal airways change, compliance declines, diaphragmatic strength decreases and respiratory drive changes, thus resulting in an increase in the risk of respiratory failure development (1). Simultaneously, elderly patients are faced with an increased risk of weaning failure and extended mechanical ventilation (2).

Some patients with weaning failure have to continue their lives with mechanical ventilation. The number of ventilatory-assisted patients living at home continues to increase. The prevalence of home mechanical ventilation (HMV) has been estimated to be 6,6 per 100,000 individuals in Europe (3). Advances in technology and health care delivery along with the patients' desire to preserve their quality-of-life and integrate into the community contribute to this increase (4). Discharging patients with home mechanical ventilator is important for the rational use of ICUs and to save health care systems costs.

Therefore, this study aimed to retrospectively investigate the discharge status, destination and HMV use of the elderly patients who experienced weaning failure during treatment period in ICU.

MATERIALS AND METHOD

We retrospectively investigated the data of patients older than 65 years who required HMV prescription due to delayed mechanical ventilation during their treatment in ICU at the University of Health Sciences Fatih Sultan Mehmet Health Research and Application Center between January 2016 and January 2018. After approval by our hospital's Scientific Studies Board (FSM SSB ref No: 2017/2134), we retrospectively investigated the patients' data. We recorded age, gender, acute

physiology and chronic health evaluation (APACHE II) scores, Glasgow Coma Scale (GCS) scores and ejection fraction (EF%) at the time of admission as well as ICU admission and respiratory insufficiency causes, ICU stay, mechanical ventilation duration, time to tracheostomy, time to switch to HMV and HMV adaptation process duration. At the time of ICU discharge, we documented the GCS scores, ventilation modes and discharge destination.

The relationship between mortality and age, APACHE II, GCS during admission, cause of intensive care admission, cause of respiratory failure, presence of comorbidities and duration of mechanical ventilation were evaluated. Age, APACHE II, GCS during admission, cause of respiratory failure, duration of mechanical ventilation, comorbidities, length of stay in the intensive care unit (ICU), time of tracheostomy and discharge GCS parameters were evaluated for their effect on transition to home mechanical ventilation. Also patients were divided into three groups based on how they were discharged: discharged with home mechanical ventilator; discharged with spontaneous respiration after home mechanical ventilator was provided and death in the ICU. The three groups were compared in terms of age, APACHE II, admission GCS, comorbidity, duration of mechanical ventilation and length of stay in the ICU.

After discharge, the family members of the patients were contacted for a telephonic interview to obtain information about the current status of the patients.

The data were examined by Shapiro–Wilk test whether it presents normal distribution. Descriptive statistics were given as mean, standard deviation and frequency. Non-normally distributed data were compared using Kruskal–Wallis test. Categorical variables were compared using Pearson's chi-squared and Fisher–Freeman–Halton tests. Backward Cox proportional hazards

regression was used to assess the associations of age, APACHE II, GCS, aetiology of respiratory failure, duration of mechanical ventilation, comorbidities and causes of ICU admission with time to death. Factors such as age, APACHE II, GCS score, aetiology of respiratory failure, duration of mechanical ventilation, comorbidities, duration of ICU stay, GCS score on discharge, day of tracheostomy and causes of ICU admission affecting HMV were identified with backward logistic regression analysis. A p-value of <0.05 was considered significant. Statistical analyses were performed with IBM SPSS ver.23.0 (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.).

RESULTS

A total of 51 patients were included in the study; 21 women (41.2%) and 30 men (58.8%). The demographic data of the patients are shown in Table 1. Twenty-eight patients (54.9%) were admitted to the ICU with primary- and 23 (45.1%) with secondary respiratory failures. Most patients had several comorbidities; Table 2 shows the comorbidity frequency and causes of ICU admission.

Twelve of the patients weaned and 13 patients died before switching to HMV. Twenty-six (51%) of the patients switched to HMV. Table 3 summarises the data during follow-up and aetiology of the patients requiring reinitiation of MV after HMV.

Twenty-six patients were discharged from the ICU. Eleven patients (42,3%) were discharged with home mechanical ventilation and 15 patients (57,7%) were discharged with spontaneous breathing. The mean GCS score of the patients at discharge was $8,9\pm 3,2$. Among the discharged patients, 4 (15,3%) were transferred to palliative

care, 3 (11,5%) to their homes, 3 (11,5%) to a nursing home, 2 (7,6%) to a hospital ward and 14 (53,8%) to a secondary ICU. We found no differences between the aetiology of respiratory failure and the ventilation type during discharge or the current status of the patients (Table 4). Family members of 15 of the 26 discharged patients could be contacted by phone. After discharge, 9 patients needed ICU re-hospitalisation and 12 of 15 patients died and the mean time to death after discharge was 107.7 ± 122.4 days. Two patients were able to spontaneously breathe and one required HMV.

The relationship between mortality and age, APACHE II, GCS during admission to ICU, cause of ICU admission, cause of respiratory failure, presence of comorbidities and duration of mechanical ventilation were evaluated. A positive correlation was found between APACHE II values and mortality rates ($p=0.05$). The mortality rate decreased as the duration of mechanical ventilation increased ($p=0.01$). There was no significant correlation between mortality and other parameters.

It was found that patients' age, APACHE II, GCS at admission, cause of respiratory failure, duration of mechanical ventilation, comorbidities, length of stay in the ICU, time of tracheostomy and GCS on discharge from the ICU did not have any effect on the transition to home mechanical ventilation.

No significant difference was found among the patients discharged with home mechanical ventilation, those discharged with spontaneous respiration after home mechanical ventilator was provided or those who died in the ICU in terms of age, APACHE II, GCS during ICU admission, comorbidities, duration of mechanical ventilation and length of stay in the ICU (Table 5).

**Table 1.** Demographical data of the patients.

Characteristics	Min–Max	Mean±sd
Age (years)	65-93	78.33±8.12
Apache II Score	10-36	23.96±5.99
Baseline GCS Score	3-15	7.93±3.74
EF (%)	20-65	54.84±10.04

Table 2. Causes of ICU admission and comorbidity distribution of the patients.

	Number of patients (%)
Cause of ICU admission	
Cerebrovascular disease	16 (31.4)
Cardiopulmonary arrest	6 (11.8)
Dyspnoea	15 (29.4)
Postoperative	5 (9.8)
Sepsis	2 (3.9)
Pneumonia	4 (7.8)
Status epilepticus	2 (3.9)
Pancreatitis	1 (2)
Number of comorbidities (%)	
None	1 (2)
1	5 (9.8)
2	14 (27.5)
3	13 (25.5)
4	15 (29.4)
5	3 (5.9)

Table 3. Data of the patients during ICU follow-up.

Duration of ICU stay (days)	57.7±36.5
Duration of MV (days)	41±22.8
Day of tracheostomy	16.7±10.6
Days to switch to HMV	50.3±28.5
Duration of HMV adaptation process (days)	3.4±3.05
Number of patients switching to MV (%)	13 (50)
Ventilatory-associated pneumonia (%)	1 (7.7)
Adaptation problems (%)	3 (23.1)
Hemodynamic disturbances (%)	6 (46.2)
Respiratory disturbances (%)	3 (23.1)
Mortality in ICU (%)	25 (49)

Table 4. Effect of the aetiology of respiratory failure on discharge ventilation and current status of the patients.

Characteristics	Aetiology of Respiratory Failure		p
	Primary n (%)	Secondary n (%)	
Discharge ventilation			^a 1.000
HMV	5 (41.7%)	6 (42.9%)	
Spontaneous	7 (58.3%)	8 (57.1%)	
Current status			^b 0.262
Alive	3 (12.5%)	- (-)	
Ex	21 (87.5%)	16 (100%)	

^aContinuity (Yates)

^bFisher's Exact Test n: number of patients

Table 5. Comparison of age, APACHE II, GCS, comorbidity, mechanical ventilation and length of stay in ICU according to patient discharge status.

Characteristics	Discharge with HMV	Spontaneous Respiration	Exitus	p
Age (years)	79.5±9.1	75.4±7.8	78.6±7.8	0.187
APACHE II	23±4.5	21.8±5.5	25.2±6.3	0.066
GCS at admission to ICU	8.7±4.4	6.7±3.1	8.2±3.6	0.546
Comorbidities (n)	3±1.3	2.3±1.3	3.1±0.9	0.121
Duration of mechanical ventilation (days)	40.8±16.2	32.6±17.4	45.6±27.5	0.316
Length of stay in ICU (days)	62.8±22.7	44.7±20.2	64±47.9	0.156

Kruskal-Wallis test

DISCUSSION

The geriatric population requiring hospitalisation and ICU admission has increased due to the increases in life expectancy (5). Geriatric patients in the ICU generally require mechanical ventilation due to respiratory insufficiency. Multiple comorbidities and muscle weakness are frequent in this patient population. Under these circumstances, the weaning process gets prolonged and sometimes they become dependent on mechanical ventilation (6,7). Chronic respiratory failure due to various reasons and requiring continuous mechanical

ventilation results in longer intensive care unit and this is not conformable for rational use of third stage intensive care units. The ideal care for such patients is following-up at intermediate care units. However, this increased need cannot be met with the existing units. For this reason, the patients can be discharged with HMV to maintain life quality at home. In our previous study, we observed that the weaning times were prolonged in geriatric patients and 54% of the patients could not be weaned (2). We have developed our clinical practice to encourage home mechanical ventilator use as a normal practice for geriatric patients with chronic



respiratory insufficiency with the cooperation of the patient's relatives to carry out the next processes at home.

We have documented 2-year follow-up data from our geriatric patients undergoing HMV procedures to evaluate the results of this practice.

There are several factors that affect the weaning and extubation processes. One of the risk factors for extubation failure is advanced age (8,9). Age also increases ICU mortality. Increased comorbidity and ICU complications increase the mechanical ventilation duration; moreover, longer mechanical ventilation increases mortality (9, 10). According to the regression analysis performed in our study, mortality decreased as the duration of mechanical ventilation increased. Contrary to expectations, there was a negative relationship between the duration of mechanical ventilation and mortality, to which our patients' death due to advanced age can be attributed. In the geriatric age group, the rapid deterioration of physiological balance in case of an acute disease may cause the patient to have limited time to respond to intensive care treatment. Geriatric patients who cannot survive this acute phase can be lost in the early stages of intensive care. We encounter prolonged mechanical ventilation periods due to advanced age-related muscle weakness in geriatric patients who survive this period. Therefore, we believe that there was a negative correlation between prolongation of mechanical ventilation and mortality rate in our patient group.

Despite the prolonged mechanical ventilation ($41 \pm 22,8$ days), 29% of the 51 patients were successfully weaned, 25% of the patients died before switching to HMV and 49% died in the ICU. In a study, the mortality of elderly mechanically ventilated ICU patients was found to be 53% (11), which is similar to our results.

Yatabe et al demonstrated that postoperative patients had lower in-hospital mortality than non-surgical patients (12). In our study, we compared the effect of the aetiology of respiratory failure on

mortality and found that the aetiology of respiratory failure did not influence the patients' outcome in terms of mortality. These results suggest that comorbidities play a more important role on mortality than the aetiology of respiratory failure in elderly patients. As expected in the geriatric age group, a significant correlation was found between APACHE II values and mortality in our study.

In the study, we included elderly patients who were prescribed HMV after prolonged weaning. After managing the acute illness in ICU, these elderly multi-morbid patients often require a long-term ventilator support (13). HMV is a good choice to decrease in-hospital infections in these fragile patients and this approach increases their integration back to society. When we looked at what is the most important factor in transition to home mechanical ventilation, we found that there was no significant correlation among age, APACHE II, admission GCS, cause of respiratory failure, duration of mechanical ventilation, comorbidities, length of stay in the ICU, tracheotomy opening time and discharge GCS parameters evaluated in our study. However, we found variable practices in the literature in terms of HMV prescriptions for geriatric patients, and a previous study has shown that patients aged >75 years had benefits from HMV (14). In our study, the adaptation period of the patients to HMV was $3,4 \pm 3,05$ days, and no problems were encountered during the transition to HMV.

Galiatsatos et al indicated that the length of ICU stay affects the destination of discharge (15). In our study, the mean duration of ICU stay was 57 days and the percentage of patients discharged home was lower than that of patients discharged to medical units (wards, palliative care and secondary ICU). In our study, no significant difference was found among the three groups of patients based on discharge type, patients discharged with home mechanical ventilation, those discharged with spontaneous respiration after home mechanical ventilator was provided or those who died in the ICU, in terms of age, APACHE II, GCS during ICU

admission, comorbidities, duration of mechanical ventilation and length of stay in the ICU. After discharge, 9 patients were re-admitted to the ICU and 12 of 15 patients that we could contact died within 1 year. The geriatric ICU population has a high long-term mortality when compared to the non-geriatric population (16). Fagon stated that post-discharge deaths in elderly patients are higher within the first 3 months (17), whereas Lieberman et al showed that most of the deaths were within the first 6 months after discharge (18). Consistent with these studies, we found the mean time of death was 107 days after discharge.

Although the estimated mortality rate is high in geriatric patients in ICUs due to advanced age, high APACHE score, low GCS, high comorbidity, prolonged mechanical ventilation and length of stay in ICU, our study showed that the rate of discharge with a home mechanical ventilator was also high in these patients. We think that it is important to plan the discharge with a home mechanical ventilator by considering the prolonged length of stay in ICU in this patient group.

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RESEARCH

POLYPHARMACY AND POTENTIALLY INAPPROPRIATE MEDICATION USE IN GERIATRIC PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT

ABSTRACT

Introduction: A potentially inappropriate medication is defined as a drug that has higher adverse effects when compared with the clinical benefit, although a safer or more efficient alternative treatment exists given the same situation. This cross-sectional study aimed to assess the presence of polypharmacy (use of five or more drugs) in older patients aged ≥ 65 years.

Materials and Method: Geriatric patients presenting to the emergency department between January and March 2018 who had been prescribed five or more drugs were evaluated with a questionnaire for potentially inappropriate medication and polypharmacy. The questionnaire comprised demographic data, chronic diseases affecting elderly patients, and chronic drugs used according to the Beers criteria (2015 version) for elderly adults.

Results: The study cohort consisted of 144 patients (56 males, 88 females). The mean age of participants was 77.23 ± 7.94 years. The most common chronic diseases were hypertension (22.5%), coronary artery disease (15.1%), and diabetes (10.7%). The three most commonly prescribed drugs were aspirin (10.8%), an angiotensin receptor blocker + thiazide (9.8%), and beta blockers (9.8%). The average number of medications used was 5.22 ± 2.56 . Polypharmacy was found in 80 patients (55.6%) whereas potentially inappropriate medication use was determined in 78 (54.2%) patients.

Conclusions: Both polypharmacy and potentially inappropriate medication use were found to have a high frequency in our study group. We found the use of potentially inappropriate medication to be significantly higher in patients with polypharmacy. The most used potentially inappropriate medications were proton pump inhibitors and non-steroidal anti-inflammatory drugs.

Keywords: Polypharmacy; Geriatrics; Potentially inappropriate medication

ARAŞTIRMA

ACİL SERVİSE BAŞVURAN GERİATRİ YAŞ GRUBUNDAKİ HASTALARDA POLİFARMASİ VE POTANSİYEL UYGUN OLMAYAN İLAÇ KULLANIMI

Öz

Giriş: Potansiyel olarak uygun olmayan bir ilaç, aynı durum göz önüne alındığında daha güvenli veya daha etkili bir alternatif tedavi mevcut olmasına rağmen, klinik fayda ile tartışıldığında daha yüksek yan etkileri olan bir ilaç olarak tanımlanmaktadır. Bu kesitsel çalışma, 65 yaş üstü yaşlı hastalarda polifarmasinin (beş veya daha fazla ilacın kullanımı) varlığını değerlendirmeyi amaçlamıştır.

Gereç ve Yöntem: Ocak ve Mart 2018 tarihleri arasında acil servise başvuran geriatri yaş grubundaki hastaların polifarmasi durumu ve potansiyel olarak uygun olmayan ilaç kullanımı durumu oluşturulan anket form ile değerlendirildi. Anket formunda demografik veriler, kronik hastalıklar ve yaşlılar için Beers kriterlerine göre (2015 versiyon) kronik ilaç kullanımı yer almaktadır.

Bulgular: Çalışma grubu, 144 hastadan oluşmaktaydı (56 erkek, 88 kadın). Katılımcıların yaş ortalaması 77.23 ± 7.94 yılı. En sık görülen kronik hastalıklar hipertansiyon (%22.5), koroner arter hastalığı (%15.1) ve diyabet (%10.7) idi. En sık kullanılan üç ilaç, aspirin (%10.8), anjiyotensin reseptör bloker + tiazid (%9.8) ve beta blokerleridir (%9.8). Kullanılan ilaç sayısı ortalaması 5.22 ± 2.56 idi. 80 hastada polifarmasi (%55.6) bulunurken, 78 (%54.2) hastada potansiyel olarak uygun olmayan ilaç kullanımı saptandı.

Sonuç: Hem polifarmasi hem de potansiyel olarak uygun olmayan ilaç kullanımının çalışma grubumuzda yüksek sıklığa sahip olduğu bulundu. En çok kullanılan potansiyel uygun olmayan ilaç, proton pompası inhibitörleri ve non-steroidal antiinflatuar ilaçlar idi.

Anahtar sözcükler: Çoklu ilaç kullanımı; Geriatri; Potansiyel uygunsuz ilaç kullanımı

INTRODUCTION

The high prevalence of comorbidities among elderly adults has led to the prescription of multiple medications. Although there is no unanimously accepted definition of polypharmacy, it is widely regarded as the use of ≥ 5 drug types (1,2). The use of numerous medications is also known to increase the risk of side effects, which is also an independent risk factor for improper drug use (3). A potential inappropriate medication (PIM) is defined as "a drug that has higher adverse effects when compared with the clinical benefit, although a safer or more efficient alternative treatment exists given the same situation" (4). The elderly population is at a higher risk for developing drug side effects, and given the definition of PIM, such prescriptions also cause increases in health care costs, hospitalization rates, and both morbidity and mortality (5, 6). Despite many suggestions to prevent the use of PIM in the elderly, there is still a high incidence in some studies. The prevalence of PIM usage in the global sense is reported to vary between 14% and 43% (7). Some tools have been developed to determine PIMs, the most commonly used being the Beers criteria, which was first released in 1991 and was last updated in 2015. The Beers criteria are derived from expert opinions, compiled publications, and consensus techniques, requiring no clinical judgment in its implementation (8,9). These criteria have led health professionals to increase the safety of prescription drugs for the elderly population by reducing the risk associated with unnecessary polypharmacy, drug interactions, and unwanted side effects (9). Today, the emergence of drug-related problems in the elderly because of PIM use coupled with increasing patient safety concerns is quickly becoming the focal point of researchers in this field (10). In this study, we aimed to determine the frequency of polypharmacy and PIM use according to the 2015 version of the Beers criteria among geriatric patients admitted to the emergency department.

MATERIALS AND METHOD

This cross-sectional study was conducted in Bolu Izzet Baysal State Hospital where geriatric patients were admitted to the Emergency Department and were analyzed between January and March 2018. The study included those who were 65 years of age and older

and consented to take part in the study. Individuals were excluded from the study if they did not agree to participate, were under the age of 65 years old, and were patients whose data collection was incomplete for reasons such as transfer to other wards. A total of 144 patients comprised the final study group. The study was approved by the local ethics committee. The study was conducted through a questionnaire, which assessed the demographic characteristics of participants, inquired about chronic diseases that are common in the elderly population, and evaluated chronic drug use in two sections according to the Beers criteria for elderly adults (1) '*potentially inappropriate medications for elderly adults* (Beers Table 2)' and (2) '*potentially inappropriate drug use criteria due to the severity of illness or symptoms for elderly adults* (Beer's Table 3)' (8). The questionnaire was completed by the patient's doctor. Polypharmacy was defined as the use of ≥ 5 different medications.

Statistical analysis

All study data were evaluated with the SPSS V20 program. The variables were given in mean \pm standard deviation or frequency (as percentage). Chi-squared analysis was used to evaluate categorical variables. Statistically significant levels were accepted as $p \leq .05$.

RESULTS

The study group consisted of 56 (38.9%) males and 88 (61.1%) females, with a total of 144 patients. The age of the study group ranged from 65 to 95 years, with the average being 77.23 ± 7.94 years. The most common three chronic diseases were hypertension (22.5%), coronary artery disease (15.1%), and diabetes (10.7%). The three most commonly prescribed drugs were aspirin (10.8%), an angiotensin receptor blocker + thiazide (9.8%), and beta blockers (9.8%) (Table 1). The average number of chronic diseases in the study group was 3.15 ± 1.59 . Of the 144 patients included in the study, a total of 499 drugs were being used with the mean number of medications being 5.22 ± 2.56 . In the study, 80 patients (55.6%) were found to have polypharmacy as they used five or more medications. There was no significant difference for age and sex among patients with or without polypharmacy ($p > .05$ for both). It was determined that both the use of PIM



and the presence of PIM-related disease symptoms were significantly higher in patients with polypharmacy ($p<.001$ and $p=0.021$, respectively) (Table 2). According to the Beers 2015 criteria, the number of patients using PIM was 78 (54.2%). The use of PIM was most common in those with gastrointestinal tract diseases (44.0%) and

those with pain (27.2%). The most commonly used drug was the proton pump inhibitor (PPI) (36.1%), followed by non-steroidal anti-inflammatory drugs (NSAIDs) (26.2%) (Table 3). The most frequent PIM-related problems were congestive heart failure (39.6%), followed by falls and fractures (25.0%).

Table 1. Specifications of the study group and their distribution.

Characteristics	n	%
Sex		
Male	56	38.9
Female	88	61.1
Age (years)		
65–74	54	37.5
75–84	59	41.0
85+	31	21.5
Chronic disease		
Hypertension	103	22.6
Coronary artery disease	69	15.2
Diabetes	49	10.8
COPD ¹	44	9.6
Congestive heart failure	36	7.6
Muscle-joint disease	33	7.2
Arrhythmia	32	7.0
Gastritis	19	4.3
Other	72	15.7
Chronic drug usage		
Aspirin	54	10.8
Beta blockers	49	9.8
ARB ² +Thiazide	49	9.8
Anti-arrhythmic	47	9.4
Proton pump inhibitors	42	8.4
Oral anti-diabetics/Insulin	36	7.2
NSAIDs ³	35	7.0
ACEi ⁴ -ARB	33	6.6
Furosemide	27	5.4
Beta agonists	25	5.0
Antiplatelet-Anti-coagulants	25	5.0
Anti-depressants	23	4.6
Other	54	11.0

1: Chronic Obstructive Pulmonary Disease, 2: Angiotensin Receptor Blocker, 3: Non-Steroidal Anti-Inflammatory Drugs, 4: Angiotensin Converting Enzyme Inhibitors

Table 2. Distribution according to specific variables in polypharmacy.

Characteristics	No polypharmacy n (%)	Polypharmacy n (%)	p
Sex			
Male	30 (53.5)	26 (46.5)	.079
Female	34 (38.6)	54 (61.4)	
Age (years)			
65-74	24 (44.4)	30 (55.6)	.995
75-84	26 (44.0)	33 (56.0)	
85+	14 (45.1)	17 (54.9)	
PIM			
No	42 (65.6)	24 (34.4)	<.001
Yes	22 (30.0)	56 (70.0)	
Disease present			
No	52 (50.4)	51 (49.6)	.021
Yes	12 (29.3)	29 (70.7)	

Table 3. Drugs used as PIMs.

Characteristics	n	%
PPI¹	44	36.1
NSAIDs²	32	26.2
Metoclopramide	10	8.2
İnsulin	10	8.2
Digoxin	7	5.7
Quetiapine	6	4.9
Doxazosin	4	3.3
Dimenhydrinate	4	3.3
Amitriptyline	2	1.6
Abizole	1	0.8
Chlorzoxazone	1	0.8

1: Proton Pump Inhibitor, 2: Non-Steroidal Anti-Inflammatory Drugs



DISCUSSION

In our study, we evaluated the frequency of polypharmacy and PIM usage and their relationship in light of the effects they have on particular variables. Although there is no generally accepted specific definition of polypharmacy, in most studies polypharmacy is defined as the use of five or more drugs (1,2). In the present study, the frequency of polypharmacy was 55.6%. In addition, the mean number of chronic medications used was 5.22 ± 2.56 in the study group. In a recent study, the frequency of polypharmacy (5 and over) was reported to be 62.3% and this result was similar to our study (11).

In another study published in our country, reported the polypharmacy rate as being 41.7% (12). In that study, the frequency of polypharmacy was low when compared with our study. However, it should be noted that in this study, usage of 10 or more drugs was considered as advanced polypharmacy, which was evaluated separately. If advanced polypharmacy rates were adjusted according to this definition and then were stratified accordingly in these studies, the rates of polypharmacy obtained would be similar to ours presented here.

In a study involving 2500 people in the United States, the rate of polypharmacy and advanced polypharmacy was reported as 35% (13). In a further study with a high cohort number of participants in the United States, polypharmacy frequency was reported to be between 35% and 40% (14). Both studies have stated that the prevalence of polypharmacy was lower when compared with studies conducted in our country. Results of a study by Lai et al. were similar to our work and showed the frequency of polypharmacy to be 55.4%. However, in this study the elderly age group was defined as being 85 years and older. In light of these results, we can state with confidence that the elderly tend to be prescribed more medications in our country. Although studies have shown a relationship between polypharmacy and negative clinical outcomes, there are other issues, which still need to be discussed, as there is still no clarity in the definition of polypharmacy. For

instance, another study suggested that the use of five or more medications is necessary for some patients, as these patients require these drugs to preserve wellbeing. They argued that it would be erroneous to consider these patients within the definition of polypharmacy. In the same study, the author stated that polypharmacy is only present if the drugs prescribed are not used for the correct indication (2). Hence, it is argued that the use of unnecessary drugs should be defined as polypharmacy rather than the number of drugs used. In a systematic review, it was suggested that the use of one or more unnecessary drugs was reported to be around 50% (15).

Interestingly, this frequency matches that of polypharmacy. The adverse clinical outcomes expressed in the emergence of polypharmacy should also be evaluated in this respect. The Beers criterion is and has been a commonly used method to assess PIM use (9, 16). In our study, the use of PIM was evaluated according to the latest 2015 version of the Beers criteria. As per this evaluation, 54.2% of our study group was considered to use PIM. The most commonly used PIMs were PPIs and NSAIDs. In addition, there was a meaningful relationship between polypharmacy and PIM in our study. The use of PIM was found to be higher in patients with polypharmacy. In studies based on the 2003 version of the Beers criteria, the use of PIM was reported to vary between 13.0% and 40.7% (17-19). Based on the 2012 version of the Beers criteria, reports have been shown to vary between 42.7% and 59.2% (9,20,21). According to the 2015 Beers criteria, it was found to be 33.2%–60.0%; which are on par with the PIM frequency detected in our study (22,23).

In addition to the current increasing incidence of PIM usage, reported incidences are also likely to increase because of the broadened scope of the 2015 version of the Beers criteria when compared with older versions. Most studies conducted according to the Beers 2012 criteria have reported benzodiazepines as the most common PIM. According to the Beers 2015 criteria consensus group, the use of the PPI was related to common complications in elderly adults. The 2015 version of the Beers criteria added PPIs

based on this evidence (8). The most common PIM in our study was PPI suggests that this addition was extremely accurate. Also, this addition is supported by another study, which compared the Beers 2012 version with the 2015 version, and found that the 2012 version showed benzodiazepines as the most common PIM. However, according to the 2015 Beers criteria, the position of benzodiazepines was overtaken by PPIs; which is consistent with the findings of our study (22). In a study performed by Nawas et al. it was noted that inappropriate PPI prescriptions constituted 40% to 80% of all PPI prescriptions (24). By focusing on the results of prolonged PPI use, reduction of inappropriate PPI usage can be attained by careful review during repeat prescriptions of patients who truly require PPIs. Studies evaluating the use of both polypharmacy and PIM are usually evaluated retrospectively and include a high number of participants. However, it should be noted that, in the current study, the records of patients were not evaluated and the patients were evaluated immediately after admittance to the emergency department. Because of this study design, our findings were dependent on patients' statements and recollection of drug use; however, the design also conferred several advantages: first, our results were not affected by errors in medical records, and second, patients could state if they had intentionally

discontinued some of their prescribed medications. Nevertheless, the number of participants in the current study was relatively low when compared with other studies on this topic.

In conclusion, the use of polypharmacy and PIM was found to be very common among elderly patients in our study group. We determined that the use of PIM to be significantly higher in patients with polypharmacy. The most used drug as PIM was the PPI, which was followed by NSAIDs. We believe that our results accurately depict the extent of both polypharmacy and PIM use in the geriatric population in Turkey, and could provide support to elucidate the reasons for PIM usage in the elderly population. Moreover, we believe that a prescription system designed according to a protocol involving PIM should be created. Although the prevention of both polypharmacy and prescribing inappropriate drugs is difficult, remedying the prescription of PIMs through such a protocol could greatly contribute to the wellbeing of patients as well as reduce health costs.

Conflict of interest

The authors declare that they have no conflicts of interest. The authors have indicated they have no financial relationships relevant to this article to disclose.

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RESEARCH

HYPOFRACTIONATED RADIOTHERAPY AND CONCOMITANT TEMOZOLOMIDE FOR HIGH-GRADE GLIAL TUMORS IN ELDERLY PATIENTS

ABSTRACT

Introduction: Glioblastoma is the most common primary tumor in adults and age is a poor prognostic factor. Its main treatment is surgical removal. After surgery, radiotherapy is the mainstay treatment for glioblastoma. The aim of this study was to evaluate the survival and toxicity of short-course radiotherapy (40 Gy in 15 fractions) and temozolomide.

Materials and Method: A total of 22 patients over 65 years received hypofractionated radiotherapy (40 Gy in 15 fractions) and temozolomide (75 mg/m²/day).

Results: No grade 3 and 4 leukopenia or thrombocytopenia occurred among the patients. The median survival for patients with grade IV disease (including gliosarcoma) was 7 months [95% confidence interval (CI), 3.0–10.9] and that of patients with grade III disease was 2 months (95% CI, 0–35.6). There was no need to stop or delay the treatment.

Conclusion: Standard and short-course radiotherapy and temozolomide were found to be equally effective to prevent disease progression and salvage treatment. Notably, elderly patients find it difficult to visit a hospital everyday. Moreover, long-term therapies are financially and physically burdensome for them. Besides, comorbidities are seen often in the elderly.

Keywords: Aged; Glioblastoma; Astrocytoma; Radiation Dose Hypofractionation; Radiotherapy

ARAŞTIRMA

YÜKSEK GRADLI GLİOMU OLAN YAŞLI HASTALARDA EŞ ZAMANLI TEMOZOLAMİD VE HİPOFRAKSİYONE RADYOTERAPİ

Öz

Giriş: Glioblastom yetişkinlerde en sık görülen tümördür. İleri yaş kötü prognostic özelliktir. Esas tedavi cerrahi olarak çıkarılmasıdır. Cerrahi sonrası, glioblastom tedavisinde ana rolü radyoterapi üstlenir. Bu çalışmanın amacı kısa kurs radyoterapinin (15 fraksiyonda 40 Gy) sağ kalım ve toksisite açısından değerlendirilmesidir.

Gereç ve Yöntem: Altmış beş yaş üstü 22 hastaya hipofraksiyone radyoterapi (15 fraksiyonda 40 Gy) ve temozolamid (75mg/m²/gün) uygulanmıştır.

Bulgular: Hiçbir hastada grad 3 ve 4 lökopeni veya trombositopeni gözlenmemiştir. Medyan sağkalım grad IV (gliosarkom dahil) hastalığı olan hastalarda 7 ay (%95GA, 3.0-10.9), grad III hastalığı olan hastalarda 2 ay (%95GA, 0-35.6). Hiçbir hastada tedaviye ara verme veya tedaviyi durdurma gerekliliği oluşmamıştır.

Sonuç: Yaşlı kişilerin hergün hastaneye gelmelerinin kolay olmadığı akılda tutulmalıdır. Aynı zamanda uzun süreli tedaviler hem maddi hem de manevi açıdan bu hastalar için yük, sıkıntı ve tehlike barındırır. Tüm bunların yanında yaşlı hastalarda eşlik eden hastalıklar sık görülür. Hastalık progresyonunu ve salvaj tedaviyi önlemek açısından standart ve kısa kurs RT ve TMZ eşit etkinlikte bulunmuştur.

Anahtar sözcükler: Yaşlı hasta; Yüksek gradlı glial tümör; Hipofraksiyone radyoterapi; Radyoterapi



INTRODUCTION

Glioblastoma (GB) is the most common primary brain tumor in adults. High-grade glial tumors have short survival rates and are among the top five causes of death (1). Despite the progress in treatment, treatment for GB is still challenging. Most studies have evaluated radiotherapy (RT) and/or chemotherapy doses in GB (WHO grade IV) but not anaplastic tumors (WHO grade III), although they lead to high-grade gliomas (HGG) with GBs.

The incidence of HGG, particularly GB, increases with age (2). The median age at prognosis is approximately 65 years (3), and age is a poor prognostic factor. The main therapy for HGG is surgical removal; however, because of comorbidities, elderly patients are often suboptimally treated (4). After surgery, RT becomes the mainstay treatment for GB.

Stupp et al. proved statistically significant survival benefit with minimal additional toxicity with concurrent RT and chemotherapy (temozolomide, TMZ) (5,6). The randomized EORTC26981/22981–NCIC CE.3 trial also showed that adding TMZ to RT improves the median and 2-year survival rates compared to RT alone (7).

As alternative to the 6-week RT and TMZ, short-course treatment can also be effective (3,8-12). The Nordic randomized, phase 3 trial revealed that TMZ and hypofractionated RT should be considered a standard treatment in elderly patients (8,13). Roa et al. demonstrated similar survival benefits with hypofractionated RT, that is, 40 Gy in 15 fractions over 3 weeks, and TMZ compared to 6-week RT (11).

In our clinic, we have offered hypofractionated RT and TMZ to patients aged more than 65 years since 2012. Therefore, this study aimed to evaluate the survival and toxicity of short-course radiotherapy (40 Gy in 15 fractions) and temozolomide.

MATERIALS AND METHOD

In this retrospective study, we identified 22 patients who received hypofractionated RT with the total radiation dose divided into large doses, and treatments were given once a day or less often. Hypofractionated RT was given over a shorter time period than the standard RT (40 Gy in 15 fractions, in 3 weeks, which has the same biological effects as the 6-week standard RT) and TMZ. Medical records of these patients who were treated with hypofractionated RT and TMZ between 2012 and 2017 were retrospectively evaluated.

Inclusion criteria were as follows: histologically proven HGG (GB or anaplastic glioma), age ≥ 65 years, Eastern Cooperative Oncology Group performance status ≤ 2 , no prior RT and/or chemotherapy to head and neck region, adequate bone marrow reserve (hemoglobin ≥ 10 g/dL, absolute neutrophil count $\geq 1,500/\mu\text{L}$, and platelet count $\geq 100,000/\mu\text{L}$), normal renal function, and normal hepatic function. Patients were excluded from the study if they were in poor medical condition because of nonmalignant systemic disease or acute infection or if they had any medical condition (physical or mental) that could interfere with the oral administration of TMZ.

All patients were simulated by computed tomography (CT) (GE BrightSpeed) with 0.125 cm slice thickness, and contoured and planned by Eclipse planning system Aria V11. Thermoplastic masks were used for the immobilization of all patients. The clinical target volume covered the edema, and 1-cm margin was added to form the planning target volume. EORTC (European Organization for Research and Treatment of Cancer) constraints were used to determine the doses for organs at risk. For every patient, the most recent magnetic resonance image was used for fusion with simulation CT.

Volumetric modulated arc therapy was given by Varian Trilogy model therapy unit (Volume Modulated Arc Therapy, i.e., Rapidarc). The RT dose was 267 cGy/fractions, 15 fractions, total of 4005 cGy, given 5 days a week, for 3 weeks. Patients were given 75 mg/m²/day of TMZ concomitantly with RT including weekends (for 7 days a week) in the morning. None of the patients received trimethoprim-sulfamethoxazole.

The Common Terminology Criteria for Adverse Events grading system was used for the assessment of toxicity, and patients were assessed weekly during RT for toxicity. Complete blood counts and blood chemistry were performed weekly during treatment. After RT was completed, TMZ was planned to continue at 150–200 mg/m²/day for six cycles (5 days for every 28 days). Patients were followed up for 3 months. The follow-up assessment included neurological evaluation, cranial magnetic resonance imaging (MRI) (either diffusion or multivoxel spectroscopic MRI), blood count, and blood chemistry.

The protocol was reviewed and approved by the local ethics committee.

Statistical analysis was performed using SPSS (PASW Statistics 18). The main objectives were to evaluate toxicity and overall survival (OS) using Kaplan–Meier analysis. OS was calculated from starting date of RT to the date of death.

RESULTS

All 22 eligible patients were evaluated for toxicity. The median age was 69 (range, 65–78) years. Of the 22 patients, 14 (64%) were men and 8 (36%) were women. Of the patients, 6 (27%) had anaplastic astrocytoma (WHO grade III), 14 (64%) had GB (WHO grade IV), and 2 (9%) had gliosarcoma (WHO

grade IV). Two patients (9%) (1 with gliosarcoma and 1 with GB) had multiple lesions. Total excision was performed in 2 (2%) patients, gross total in 5 (23%), subtotal in 3 (14%), and biopsy in 12 (54%).

The Common Terminology Criteria for Adverse Events grading system was used for the assessment of toxicity. The TMZ+RT combination was well tolerated. Although the main side effect was expected to be myelosuppression, during the concomitant RT+TMZ, no grade 3 and 4 leukopenia or thrombocytopenia occurred in patients. Only one patient experienced serious infection and subsequently died of sepsis after 5 months of RT completion. No neurotoxicity was seen. Scalp reactions and hair loss were observed in all patients. Grade 1 (faint erythema or dry desquamation) radiation dermatitis was reported in all patients. Grade 1 nausea (loss of appetite without alteration in eating habits) was seen in 50% of patients and was medicated. Neither an interruption nor a need to stop was needed for the treatment.

Late neurologic side effects were not assessed because of the short follow-up duration.

SPSS 18 was used for statistical analyses. The median OS was 7 months; 6-month, 1-year and 2-year OS for the whole cohort were 63%, 40% and 22% respectively (fig. 1) The median follow-up for the entire group was 8 (range, 0–58) months. During the analysis period, all patients had died. One patient died of sepsis which occurred after 5 months, and in another one patient, the death cause was not related to malignancy. The median survival for patients with grade IV disease (including gliosarcoma) was 7 months [95% confidence interval (CI), 3.0–10.9] and 2 months (95% CI, 0–35.6) for patients with grade III disease. There was no statistical difference between survival among the patients ($p=0.27$).

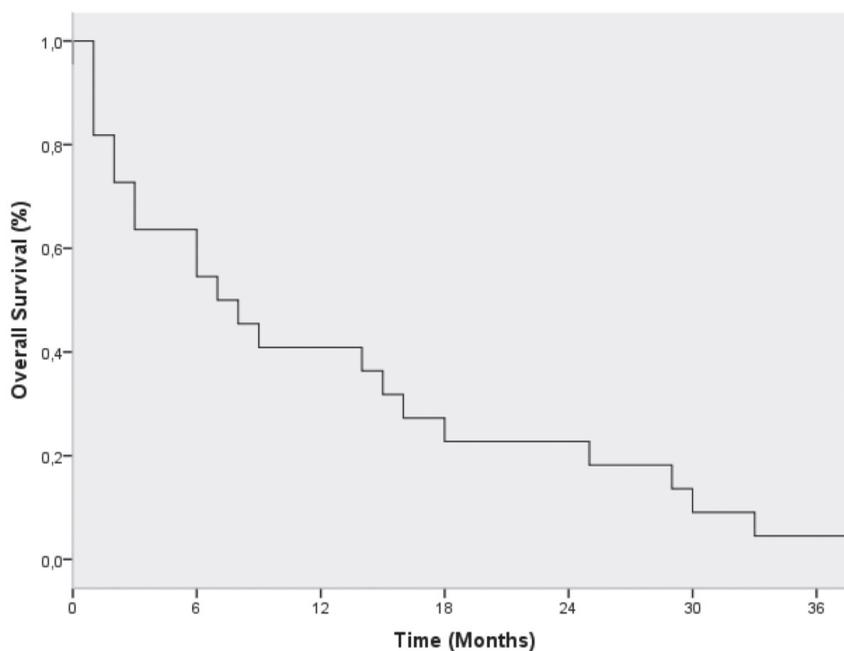


Figure 1. Overall Survival.

According to the extent of surgery, e.g., gross total excision vs others, the median survival was 12 months (95% CI, 0–41.6) vs 3.4 months (95% CI, 0–12.7). Although the extent of surgery was not found to be a statistically significant predictor, there was a tendency for longer survival for gross total excision. There was no difference in survival with respect to sex.

DISCUSSION

Elderly patients with HGG have short survival time; therefore, undergoing therapies that do not offer longer survival should be avoided (14). RT is well known to prolong survival compared to best supportive management (7). In another study, combined therapy was reported to be beneficial in patients aged 60–70 years (6). The standard 6-week RT can be associated with important risks of morbidity, treatment interruptions, and even

treatment cessation (8). When TMZ is combined with RT, the risk for death decreases; therefore, the median OS is prolonged compared to RT alone (10). Numerous studies indicated that almost 50% of elderly patients may fail to undergo treatment (15). Stephanie et al. reported that treatment interruptions were seen in 6-week RT and TMZ because of toxicities, although the TMZ dose was mostly 50mg/m²(2). In our study, we were able to give radiotherapy and 75mg/m² TMZ without any interruption. As short course radiotherapy and TMZ regime was used, the duration for therapy was shortened and there was no need for either interruption or cessation.

The PERNO study identified the groups that will benefit from RT and temozolomide. RT was given either in short course or 6-week course. TMZ was used in both groups. There was no difference in median survival between hypofractionated or full-dose RT groups (4). Roa et al. reported that the median survivals were similar for the short-course

group (5.6 months) and 6-week group (5.1 months). Moreover, there were no differences in the Karnofsky Performance Status (KPS) scores between the groups both at the first follow-up and over time (11). In another study, the median OS was found to be 11 months (2). The OS rate was 48% at 1 year and 8% at 2 years. During the follow-up, all patients had died because of tumor progression. In general, the OS in elderly patients was 4–9 months (2). Similarly, the standard and short-course RT and TMZ were found to be equally effective to avoid disease progression and salvage treatment (5). Similarly, in our study, the median survival was found to be 7 months. The 1-year OS was 40% and the 2-year OS was 22%.

Quality of life scores for function and symptoms do not differ between short-course RT and short-course RT+ TMZ (10). Although postoperative RT and TMZ have been established as the standard treatment for GB (2), optimal treatment of HGG in the elderly is still unclear. After surgery, RT and/or TMZ demonstrated to prolong survival in most studies (16). For elderly patients with GB, the National Comprehensive Cancer Network guidelines recommend combined RT and TMZ (category 2B). In Uto et al.'s trial, only one patient had experienced grade 4 hematological adverse event, and no grade 3 or higher nonhematological adverse event was found (12). In Greer et al.'s study, hypofractionated RT was well tolerated, in which no RTOG grade 3/4 toxicities was reported (17). Similarly, in our study, any grade 3/4 toxicity was not noted. It is well known that toxicities (especially grade 3 and grade 4) make differences in quality of life scores. As in our study no grade 3 or grade 4 toxicity was seen, all of the patients have tolerated the treatment.

Among elderly patients (≥ 70 years old) with fair-good performance status ($KPS \geq 50$), The ASTRO (American Society for Radiation Oncology) evidence-based clinical practice guideline recommends external beam RT following biopsy or resection, as RT (compared to supportive care alone) improves OS without impairing quality of life or cognition (strong

evidence) (18). Among elderly patients, there is no evidence that conventionally fractionated RT (60 Gy in 30 fractions over 6 weeks) is more efficacious than hypofractionated RT (e.g., 40 Gy in 15 fractions over 3 weeks). Compared to conventionally fractionated RT, hypofractionated RT has been associated with superior survival and less corticosteroid requirement (strong evidence) (18).

Moreover, Fabio et al. concluded that if O6-methylguanine-DNA-methyltransferase (MGMT) promoter methylation status cannot be tested, combined modality therapy with hypofractionated RT with concurrent TMZ would be well enough as the initial approach (19).

Our study has some limitations. We were unable to put forth the MGMT status. In addition, the death status was learned from the relatives of the patients, so we were unable to deliver disease-free survivals.

In conclusion, surgical resection should be as wide as it can be. As adjuvant therapy, hypofractionated RT with TMZ is the best treatment choice, particularly if the MGMT promoter methylation status is unknown. Moreover, a short treatment time has numerous advantages besides having survival time comparable to standard treatment. Clinical, social, and financial conditions must be considered when determining the optimal age-specific treatment approach for HGG (15).

In our study we have found that short course radiotherapy with TMZ can be tolerated by elderly patients and has got similar outcomes as the standard treatment. Notably, elderly patients find it difficult to go to a hospital everyday; besides, relatives are not always willing to take them to a hospital. Further, long-term treatments are financially and physically burdensome for them, and comorbidities are seen often among elder patients.

Conflict of interest

The authors declare no conflicts of interest associated with this study.



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RESEARCH

INCIDENCE OF HOME ACCIDENTS IN 65 YEARS OF AGE AND OLDER INDIVIDUALS AND RELATED FACTORS

ABSTRACT

Introduction: This study aims to investigate the incidence and related factors of home accidents in old individuals living at home.

Materials and Method: 1185 individuals aged 65 years and above, living in Niğde Province city centre participated in this sectional study. The data were collected through a survey form prepared by the researcher after literature review, Activities of Daily Living Assessment Form and Instrumental Daily Life Activities Form of Lawton and Brody. Chi-Square and logistic regression analysis were used for assessing the data.

Results: Mean age of participants was 71.1±6.1 years, and incidence of home accidents within the past year was 20.3%. The most common accident types were falls (75.8%), cuts and injuries (12.1%) and burns (8.8%). Accidents occurred frequently in winter and in bedrooms or living rooms. In terms of underlying causes for home accidents, primary individual factors were loss of balance and lack of attention, while domestic risk factors were wet floor and tripping. Women and the people who were independent of the majority of basic Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) suffered more home accidents.

Conclusion: More than a third of the old people, who had home accidents, experienced them twice or more within the past year. This indicates that home accidents have not been given sufficient attention. It is believed that adjusting home conditions of old people to prevent accidents and training them as well as their caregivers about home accidents can decrease such incidences.

Keywords: Aged; Accidents, Home; Risk factors; Turkey

ARAŞTIRMA

65 YAŞ VE ÜSTÜ BİREYLERDE EV KAZALARI GÖRÜLME SIKLIĞI VE İLİŞKİLİ FAKTÖRLER

Öz

Giriş: Bu çalışmanın amacı evde kalan yaşlılarda ev kazaları geçirme sıklığı ve ilişkili faktörleri araştırmaktır.

Gereç ve Yöntem: Bu kesitsel çalışmaya Niğde İl merkezinde yaşayan 65 yaş ve üstü 1185 yaşlı katılmıştır. Araştırma verileri, araştırmacı tarafından literatür bilgileri taranarak hazırlanan anket formu ile Günlük Yaşam Aktivitelerini (GYA) Değerlendirme Formu ve Lawton ve Brody'nin Enstrümental Günlük Yaşam Aktiviteleri (EGYA) formu aracılığıyla toplanmıştır. Verilerin değerlendirilmesinde Ki-kare ve lojistik regresyon analizi kullanılmıştır.

Bulgular: Araştırmaya katılanların yaş ortalaması 71.1±6.1 yıl, son bir yılda ev kazası geçirme sıklığı %20.3'tür. Ev kazası geçirenlerin %37.5'i son bir yılda iki ve daha fazla ev kazası geçirmiştir. En çok görülen kaza türleri düşme (%75.8), kesik-yaralanma (%12.1), yanma (%8.8)'dir. Kazalar sıklıkla kış mevsiminde, oda-salonda meydana gelmiştir. Ev kazası açısından, bireysel faktörlerden denge sağlayamama ve dikkatsizlik, konut risk faktörlerinden zeminin ıslak olması ve ayaağın takılması etkenleri, ev kazası geçirme nedenleri arasında ilk sıralardadır. Kadınlar ve temel günlük yaşam ve enstrümental günlük yaşam aktivitelerinin çoğunda bağımsız olanlar daha fazla ev kazası geçirmişlerdir.

Sonuç: Ev kazası geçiren yaşlıların üçte birinden fazlasının son bir yılda iki ve daha fazla ev kazası geçirmiş olması, ev kazalarına gereken önemin verilmmediğini göstermektedir. Yaşlıların ev koşullarının kazaları önlemeye yönelik olarak düzenlenmesi, yaşlıların ve onlara bakım verenlerin kazalar konusunda eğitilmesinin ev kazaları sıklığını azaltacağı düşünülmektedir.

Anahtar sözcükler: Yaşlı; Ev kazaları; Risk faktörleri; Türkiye



INTRODUCTION

Ageing is a natural process of human life. However, no matter how natural and ordinary it is, old age and ageing appear as undesirable phenomena (1). Physical, psychological and social insufficiencies, problems with the muscular and skeletal system, loss of sensory and motor functions increase the dependency of old people on others as well as the risk of having accidents (2). Especially 65+ individuals are in high risk in terms of having home accidents (3).

Number of fatal home accidents such as falls has seen a steeper increase than demographic tendencies (4). Injuries, hospitalisation and ER visits due to home accidents have been predominant. Home accidents take the first place in terms of non-fatal injuries in the elderly (51%) (5). It is stated that home accidents are realised later than other types of accidents because they usually occur inside the house, are unnoticed by others and are not always reported to health authorities (6, 7). Although the rate of home accident incidents is lower in 65+ individuals than in younger age groups, the resulting injuries tend to be more serious. Especially the 75+ age group is most seriously affected by these injuries. Because the rate of female individuals is higher in the population, old females experience more home accidents than old males (8). Falls are the main form of home accidents that old people experience (9).

MATERIALS AND METHOD

Design and setting

This sectional study, which aims at determining the home accidents experienced by old individuals and the relevant risk factors, was conducted in the Niğde Province city centre of Turkey with 1185 old individuals between April 2015 and November 2016. A population weighted cluster sampling method was used in the study as recommended by WHO for health studies carried out in large geographical areas (10). An incidence range between 10.1% and 65.3%

is mentioned in the literature for home accidents. The calculation of the sample size was based on an incidence level of 56.9% (11). In the sample size calculation, the following values were taken as basis: $\alpha=0.05$, $\beta =0.20$ %10 deviation and cluster effect=2. According to this calculation at least 1174 individuals had to be reached.

The study had a cluster volume of 15, which is larger than 7 recommended by WHO. Accordingly, the number of clusters was calculated as 79 (1174/15=78.3, rounded to 79. 79*15=1185 individuals reached). Neighbourhoods were organised alphabetically. Cumulative populations were calculated in the list created. Residential units out of which the clusters would be taken were determined through population weighted systematic methodology.

Based on the Turkish Statistical Institute 2014 data, the population of Niğde's neighbourhoods and the central population of Niğde were determined (12). The settlements where the clusters will be taken were determined by the population-weighted systematic method. For this, the total population was divided by the number of clusters and the sampling interval was determined (127980/79=1620). The settlement where the first cluster was located was determined by random numbers from the first sample interval. 2,3,...,79. Settlements, where the cluster will be located, were determined by adding a sample interval to the cumulative population of the settlement where the first cluster is located.

Data Collection Tools

Survey Form

The survey form aiming at determining the sociodemographic characteristics, health information, home accidents experienced and risk factors in the home environment composed of 4 parts containing 64 questions in total.

Activities of Daily Living Assessment Form

It was developed by Katz et al. in 1963 (13). Katz's Activities of Daily Living (ADL) form assesses an individual's ability to perform activities of daily

living independently. The form, consisting of 6 questions, contains information regarding bathing, dressing, toileting, transferring, continence and feeding activities. The individual is given 3 points if he performs ADL independently, 2 points if he can perform them with assistance and 1 point if he cannot perform them at all.

Instrumental Activities of Daily Living Assessment Form

The Instrumental Activities of Daily Living (IADL) Form, developed by Lawton and Brody in 1969, determines an individual's instrumental activities of daily living (14). The IADL Form consists of 8 questions and covers information regarding the ability to use telephone, prepare food, do shopping, do housework, do laundry, use means of transportation, use medication and manage own finances (15). The individual is given 3 points if he performs ADL independently, 2 points if he can perform them with assistance and 1 point if he cannot perform them at all.

Data Analysis

Data was summarised as mean±standard deviation and percentage. T test was used for parametric two-group comparison and ANOVA for groups of more than two. Chi-square test was employed for the comparison of categorical data. For the determination of risk factors, parameters where difference in individual comparisons was observed were assessed through regression analysis. The level of significance was taken as 0.05.

Ethical consideration

The permissions to conduct this research were given by Selçuk University Faculty of Medicine Ethical Commission (no.2015/119). For data collection, old individuals were informed and their informed consent was obtained for participation in the study. The researcher performed data collection during face-to-face interviews at the participants' homes, using a survey that was pre-prepared and pre-tested.

RESULTS

49.4% of the participants were female and 50.6% were male. 75.7% of participants were in the 65–74 age group. The mean age was 71.1±6.1 years. 63.5% of the participants were married; in 32.2% of these cases, the spouse was deceased. It was determined that 33.9% of the old individuals were illiterate and 49.9% were primary school graduates. 47.4% of the participants were retired, 47.7% were housewives, 10.5% engaged in farming and 93.0% had social security. 81.0% of the participants had regular income, where 61.5% reported that the income covered their costs. 51.3% lived together with their spouse, 15.4% with their married children and 13.6% on their own. The rate of those who had a home accident within the past year was 20.3%, of which 60.0% were females and 40.0% males ($\chi^2=13,830$, $p=0,000$).

As for the incidence of home accidents, among those who experienced home accidents within the last year, 62.5% had an accident once, 24.6% twice, 11.7% three times and 1.2% four times. Of all accidents experienced, 75.8% included falls, 12.1% cuts and injuries, 8.8% burns, 3.3% bumps and knocks. Home accidents occurred most frequently at noon time (41.2%) and in winter (36.2).

39.2% of home accidents occurred in the bedroom/living room, 22.9% in the kitchen, 17.5% in the corridor, 14.6% in the bathroom, 3.8% in the toilet and 2.1% on the stairs. Home accidents occurred most commonly while walking (52.9%) and due to loss of balance (22.5%) (Table 1). 30.5% of the old individuals stated that the accident they had experienced did not affect their daily activities, whereas 63.3% reported that their ability to move and perform activities became restricted and 6.2% told that they now act more carefully.

49.2% of the participants who resorted to a health institution following the home accident, 19.6% were hospitalised. 80.9% of the hospitalised individuals suffered from falls and 14.9% from burns. 13.3% had a permanent disability after the home accident.



19.2% of the participants live on the ground floor or in detached houses where the use of stairs is not required. Among the old individuals who live in a house without a lift, 39.6% reported that they experienced difficulties in using the stairway.

51.7% of the dwellings occupied had thresholds within the house. 20.2% did not pay attention to keeping the walking route clear of obstacles. 28.3% tripped on carpets often. 22.9% of the old individuals were often injured because of objects with hard or sharp corners. 28.6% had holding grips in the bathroom, 68.0% took precautions against slipping in the bathroom. 31.1% had holding grips in the toilet. 66.8% had night lighting installed. 19.1% could not easily distinguish the on-off status of electronic devices. 90.7% had placed the phone to an easily reachable position, 66.1% knew the emergency phone numbers.

81.4% of the participants suffered from at least one illness. 40.0% had two or more illnesses. 73.8% were on continuous medication. The most common diagnosed diseases the participants suffered from were high blood pressure (54.0%), diabetes mellitus (21.9%), heart diseases (19.9%) and respiratory diseases (asthma, COPD) (16.6%). There was a significant correlation between the presence of an illness and occurrence of home accidents, as well as between the use of walking stick and occurrence of home accidents ($p < 0.05$). No significant correlation was found between visual or hearing problems and occurrence of home accidents. ($p > 0.05$) (Table 2).

31.1% of the participants stated that they had sleep deficiency. 72.0% of the old individuals consumed less than 8 glasses of water. 16.8% of the old individuals smoked cigarettes and 2.7% consumed alcohol.

Table 1. Activities undertaken during the home accidents and Factor causing the occurrence of home accidents within the last year.

Activity causing the home accident	Occurrence of home accident		Factor causing the home accident	Occurrence of home accident	
	N	(%)		N	(%)
Walking	127	(52.9)	Loss of balance	54	(22.5)
Preparing food	46	(19.2)	Lack of attention	53	(22.1)
Bathing	21	(8.8)	Wet floor	43	(17.9)
Toileting	12	(5.0)	Dizziness	40	(16.7)
Reaching up/ getting down	11	(4.6)	Tripping	34	(14.2)
Cleaning the house	12	(5.0)	Moving around in the dark	6	(2.4)
Standing up	7	(2.9)	Impaired vision	5	(2.1)
Igniting the stove	3	(1.2)	Difficulty in walking	5	(2.1)
Dressing	1	(0.4)			
Total	240	(100.0)	Total	240	(100.0)

Table 2. Relationship between occurrence of home accidents and health condition.

Individuals who experienced home accidents	with N (%)	without N (%)	χ^2	p
an illness	212 (88.3)	18 (11.7)	9.67	0.002
visual impairment	151 (62.9)	89 (37.1)	2.81	0.093
hearing impairment	73 (30.4)	167 (69.6)	0.74	0.390
walking aid	118 (49.1)	122 (50.9)	31.57	0.000

Table 3. Relationship between occurrence of home accident and dependence in daily and instrumental daily life activities.

	N		%		N		%		N		%		χ^2	p
Bathing	164	68.3	76	31.7	770	81.5	175	18.5	1185	100	19.8	0.000		
Dressing	190	79.2	50	20.8	832	88.0	113	12.0	1185	100	12.7	0.000		
Toileting	195	81.2	45	18.8	838	88.7	107	11.3	1185	100	9.4	0.002		
Movement	110	45.8	130	54.2	565	59.8	380	40.2	1185	100	15.2	0.000		
Continence	185	77.1	55	22.9	819	86.7	126	13.3	1185	100	13.5	0.000		
Feeding	208	86.7	32	13.3	864	91.4	81	8.6	1185	100	5.0	0.080		
Telephoning	128	53.3	112	46.7	609	64.4	336	35.6	1185	100	10.0	0.002		
Shopping	132	55.0	108	45.0	597	63.2	348	36.8	1185	100	5.4	0.020		
Preparing food	123	51.2	117	48.8	587	62.1	358	37.9	1185	100	9.4	0.002		
Doing housework	98	40.8	142	59.2	496	52.5	449	47.5	1185	100	10.3	0.001		
Doing laundry	99	41.2	141	58.8	436	46.1	509	53.9	1185	100	1.8	0.174		
Using transportation	70	29.2	170	70.8	464	49.1	481	50.9	1185	100	30.7	0.000		
Using medication	181	75.4	59	24.6	787	83.3	158	16.7	1185	100	7.9	0.005		
Managing own finance	183	76.2	57	23.8	776	82.1	169	17.9	1185	100	4.2	0.039		



Table 4. Logistic regression results of daily living activities associated with occurrence of home accidents*.

Variable	Coefficient	Standard error	Wald x ²	p	Odds ratio
Bathing	-.383	.272	1.979	.160	.682
Dressing	-.008	.350	.001	.982	.992
Toileting	.018	.345	.003	.959	1.018
Movement	.118	.204	.334	.563	1.125
Continenence	-.266	.240	1.226	.268	.767
Constant	1.371	.072	359.511	.000	

Table 5. Logistic regression results of instrumental daily living activities associated with occurrence of home accidents*.

Variable	Coefficient	Standard Error	Wald x ²	p	Odds ratio
Using telephone	-.298	.181	2.719	.099	.742
Shopping	.436	.219	3.959	.047	1.546
Preparing food	-.080	.219	.133	.715	.923
Doing housework	-.170	.220	.596	.440	.844
Using transportation	-.801	.221	13.160	.000	.449
Using medication	.062	.250	.062	.804	1.064
Managing own finance	.067	.247	.073	.812	1.082
Constant	.2.419	.257	88.717	.000	11.235

Activities of daily living scores of the participants

Based on the total scores the participants obtained from the ADL form, 50.5% were independent in all activities, 49.5% were dependent in at least one activity. Across the age groups, dependence increased with age ($\chi^2=26.058, p=0.000$).

Based on the analysis of the relationship between the occurrence of home accidents and the dependence on ADL, the people who were

independent in terms of daily life activities such as bathing, dressing, toileting and continence and dependent in terms of movement suffered more home accidents (Table 3).

However, based on logistic regression analysis of the relationship between the occurrence of home accidents and the dependence on ADL, it was determined that the variables of daily living activities had no significant effect on the occurrence of home accidents (Table 4).

Based on the total scores the participants obtained from the IADL form, 21.2% were independent in all activities, 78.8% were dependent in at least one activity.

Based on the analysis of the relationship between the occurrence of home accidents and the dependence on IADL, the people who were independent in terms of instrumental daily life activities such as telephoning, shopping, preparing food and managing own finance and dependent in terms of doing housework and using transportation suffered more home accidents (Table 3).

However, as shown in Table 5, among the IADL, only shopping and using means of transportation variables had a significant effect on the occurrence of home accidents (Table 5).

DISCUSSION

Home is a place where individuals feel safe but it can cause fatal injuries in children and old people (16). Since the aged spend most of their time at home, they are at higher risk of experiencing home accidents (17). Reasons why old individuals experience home accidents include acute and chronic diseases, physiological changes and physical incapability (forgetfulness, tendency to get tired quickly, visual impairment, dizziness etc.) (18). Our study similarly found a correlation between the presence of chronic diseases and occurrence of home accidents and observed that a high percentage of old individuals had at least one chronic disease. Furthermore, the possibility of a home accident resulting in death is higher in old people (19). Therefore, studies aiming to determine the prevalence of home accidents in old individuals and the related risk factors are important in terms of developing preventive measures (20).

In our study, 20.3% of the old individuals stated that they had had a home accident within the past year. Studies in the literature point out an incidence range between 10.1% and 38.6% (21,22,23,24). This variation stems from different age distribution, duration (3 months–6 months–1 year) and place (outpatient clinic etc.) of each study as well as from the fact that, in studies where the prevalence of home accidents in the past year is investigated, the accidents cannot be recalled well or old people just ignore some accidents they experience.

Based on the incidence of home accidents observed in our study, 37.5% of the old individuals who had a home accident within the past year had experienced two or more accidents. It gives rise to the thought that home accidents are underrated and necessary precautions are not taken in the home environment. In our study, it was revealed that home accidents happen most frequently during walking. The fact that falls take the first place among the most common accident types supports this finding. That accidents occurred most frequently in bedroom/living room and during walking may be ascribed to slippery rugs and carpets. It can be concluded that accidents in the kitchen stem from higher number of tools and devices in the kitchen compared to other areas that can lead to accidents as well as from slippery carpets and rugs, and accidents in the bathroom and toilet stem from lack of holding grips as safety against slippery floor.

Apart from the accident itself, further important problems for old people seem to be lack of correct first aid treatment after the accident, low rate of resorting to a health institution, permanent disability because of the home accident, lack of sufficient precautions to prevent new accidents.

More than half of the houses where the old people resided in had door sills. Sills between



rooms and inconveniently placed objects etc. are risk factors that increase incidence of falls (25).

Approximately 10.0% had their telephone at a place not easily reachable, and more than one third of the old individuals did not know the emergency phone numbers. Gür also states in his study that 45.9% of the houses did not keep emergency phone numbers somewhere easily reachable and 17.7% placed the telephone to somewhere difficult to reach (11). This may result from low level of education between the old individuals and presence of relatives in the house who can make the call.

Although no significant correlation was found between home accidents and dependence in terms of ADL, it was observed in our study that old individuals who could perform bathing, dressing, toileting and continence independently had more accidents than those who could not. This could stem from the fact that individuals who can independently perform ADL engage in more activities, have a larger area of activity within the house, and their physical and mental functions degrade with age although they are independent. On the other hand, individuals who could not move independently had more accidents than those who could. As it was observed in our study that old individuals who did not use walking aid such as walking sticks -although they were supposed to- also had more home accidents, it can be concluded that they experience more accidents compared to independent individuals because of lack of walking aid despite the necessity, loss of balance, difficulty in walking, tripping and dizziness.

Similarly, although no significant correlation was determined between home accidents and dependence in IADL, it was observed in our study that old individuals who could use phone, do shopping, prepare food, use their own medication,

manage their own finances independently had more accidents compared to those who were dependent in terms of these activities. This could stem from the fact that independent individuals engage in more activities, have a larger area of activity within the house, and their physical and mental functions degrade with age although they are independent. Individuals who were dependent in terms of doing housework and using means of transportation had significantly more accidents than independent individuals. This may be due to the fact that these activities require more physical effort and movement, which dependent individuals cannot fulfil.

To conclude, the fact that old individuals had two or more home accidents within the past year indicates that the importance of home accidents has been underrated. Women and the people who were independent of the majority of basic ADL and IADL suffered more home accidents. The most common type of home accident experienced by old individuals was falls, most frequently while walking, due to loss of balance or dizziness in bedrooms/ living rooms.

It is crucial that current dwellings are adjusted to the needs of old individuals. Risk assessment must be conducted and risks should be minimised. It can be suggested that public institutions such as municipalities, Ministry of Health, Ministry of Family Affairs and Social Policies establish a unit to deal with home accidents.

Despite the high incidence of home accidents there is no sufficient surveillance system for these types of accidents in Turkey. Systematic recording of home accidents is important both to determine the risk factors and to take precautions against these factors.

Conflict of Interest

We had no financial support for this research and no conflicts of interest.

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RESEARCH

PROFILE OF GERIATRIC PATIENTS IN A NEURO-OPHTHALMOLOGY OUTPATIENT CLINIC

ABSTRACT

Introduction: To determine the clinical profile of geriatric patients in a neuro-ophthalmology outpatient clinic of a tertiary center.

Materials and Method: Retrospective evaluation of medical records from the institutional database, including patients aged ≥ 65 years who were treated by the same neuro-ophthalmologist, was performed.

Results: A total of 99 (52 F, 47 M) geriatric patients were analyzed. Mean age was 72.14 ± 5.26 years. The most frequent complaint was visual loss (48.9%), followed by oculomotor abnormalities (38.7%). Thirty-eight of 48 patients had permanent visual loss, whereas 10 had transient visual loss. Patients with permanent visual loss were older than those with transient visual loss [mean ages of 73.05 ± 5.85 and 68.5 ± 2.84 years, respectively ($p=0.022$)]. Diplopia was the primary symptom, followed by ptosis in the oculomotor group.

Conclusion: Neuro-ophthalmological diseases have many manifestations in the aging population. Physiological changes and risk factors associated with aging may lead to different complaints from young adults. This study contributed to the neuro-ophthalmological profile of Turkish geriatric patients.

Keywords: Diplopia; Vision, Ocular; Blepharoptosis; Aged

ARAŞTIRMA

NÖRO-OFTALMOLOJİ POLİKLİNİĞİNDEKİ GERİATRİ YAŞ GRUBUNDAKİ HASTALARIN ÖZELLİKLERİ

Öz

Giriş: Üçüncü basamak bir merkezin nöro-oftalmoloji polikliniğindeki geriatri yaş grubundaki hastaların klinik özelliklerinin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Aynı nöro-oftalmolog tarafından takip edilen 65 yaş ve üzerindeki hastaların tıbbi kayıtları geriye dönük olarak incelendi.

Bulgular: Toplamda 99 (52 K, 47 E) geriatik hasta analiz edildi. Ortalama yaş 72.14 ± 5.26 olarak saptandı. En sık görülen yakınma görme kaybı (%48.9) iken, takiben oküler motor anormallikler (%38.7) gelmekteydi. Kırk sekiz hastanın 38'inde kalıcı görme kaybı varken, 10 hastada geçici görme kaybı izlendi. Kalıcı görme kaybı olan hastalar, geçici görme kaybı olanlara göre daha yaşlıydı [ortalama yaşlar sırasıyla; 73.05 ± 5.85 ve 68.5 ± 2.84 yaş, ($p=0.022$)]. Oküler motor grupta diplopi birincil semptom olup, ikinci sırada pitoz yer almaktaydı.

Sonuç: Nöro-oftalmolojik hastalıkların yaşlı popülasyonda birçok belirtisi vardır. Yaşlanmayla ilişkili fizyolojik değişiklikler ve risk faktörleri, genç erişkinlerden farklı yakınmalara yol açabilir. Bu çalışma Türk geriatri yaş grubundaki hastaların nöro-oftalmoloji profilinin ortaya konmasına katkı sağlamıştır.

Anahtar Sözcükler: Çift görme; Görme; Pitoz; Yaşlılık



INTRODUCTION

The elderly population has been increasing in recent decades. With aging, reduced adaptation and compromised biological functions are observed. Presbyopia is a good example of the normal loss of focusing ability with regard to near objects, which occurs with advanced age (1). Bodily systems are vulnerable to diseases; as the life span is extended, the likelihood of health problems increases (2).

Visual problems related to the nervous system constitute a group of disorders that may occur at any age and impact daily life. The most common complaints are visual loss, diplopia, and eye pain.

Moreover, the clinical profile of neuro-ophthalmological involvement can be different in young and geriatric patients. For instance, optic neuropathy is often associated with inflammation in young people, whereas it is associated with ischemia in the elderly (3).

Importantly, there are even more unfavorable effects of visual loss in the geriatric population such as depression, falls, and poorer quality of life (4).

Age-related maculopathy, cataract, and glaucoma are the most common reasons for elderly patients to seek admission to an ophthalmology clinic (5). Pupil involving third cranial nerve palsy, anterior ischemic optic neuropathy, Horner syndrome, and diplopia are infrequent manifestations, but should not be missed by ophthalmologists and neurologists.

In this study, the clinical profile of patients ≥ 65 years was studied to assess the common diagnoses and etiological factors encountered in the neuro-ophthalmology outpatient clinic of a single center.

MATERIALS AND METHOD

Data collection

Medical records of patients aged ≥ 65 years, who were referred to the neuro-ophthalmology clinic of a tertiary medical center were reviewed. This retrospective study was approved by the ethics committee of our institution (number: GO18/678),

in accordance with the Declaration of Helsinki. All the included patients were examined and followed by the same neuro-ophthalmologist, and had been treated between June 2014 and November 2014 or December 2015 and June 2018.

Demographic information, including age and sex, medical history prior to neurological disease, diabetes mellitus, hypertension, and hypercholesterolemia; and the presence of concomitant ocular diseases, such as macular degeneration, glaucoma, and diabetic retinopathy were recorded. Complete neuro-ophthalmological assessment was performed, including visual acuity (using a Snellen chart), color vision (using the Ishihara test), pupillary examination, visual fields by confrontation, and fundus examination. Imaging studies (magnetic resonance imaging, carotid and Cerebral computed tomography angiography) and electrophysiological studies (single-fiber electromyography and visual evoked potentials) were recorded.

Statistical analysis

Statistical analyses were performed with WIZARD 1.9.18 for MacOS. Numerical variables are presented as the mean \pm standard deviation or median (min-max); categorical variables presented as frequencies and percentages. Categorical variables were compared using the chi-squared test; continuous variables were compared using the Mann-Whitney U test. A p value of less than 0.05 was considered statistically significant.

RESULTS

During the periods of June 2014 to November 2014 and December 2015 to June 2018, in almost 3 years, 129 patients aged ≥ 65 years, who were admitted to our neuro-ophthalmology outpatient clinic, were evaluated for participation in the study. Ninety-nine of these patients had complete medical records, including history, examination, and work-up. These 99 patients had a mean age of 72.14 ± 5.26 years. The number of females ($n=52$) and males ($n=47$)

patients was similar, and the mean age of the female patients (72.9±5.25 years) was similar to that of the male patients (72.9±5.25 years). The most frequent complaint was visual loss (48.9%), followed by oculomotor abnormalities (38.7%) and others (12.4%).

Of the 48 patients (22 F, 26 M) who presented with visual loss, 38 had permanent loss of vision and 10 had transient loss of vision. Patients with permanent visual loss (mean age, 73.05±5.85 years) were older than those with temporary visual loss (mean age, 68.5±2.84 years) (p=0.02). Among patients aged 65–74 years, the proportion with permanent visual loss was 67.9% and the proportion with transient visual loss was 32.1%; among patients aged ≥75 years,

the proportions with permanent and transient visual loss were 95% and 5%, respectively (p=0.022).

In the permanent visual loss group, the most common cause was non-arteritic ischemic optic neuropathy (NAION), which was observed in 18 of 38 patients (47.3%). In the transient visual loss group, amaurosis fugax (AF) was the most common cause, observed in 5 of 10 patients (50%). The diagnoses of patients with visual loss are summarized in Table 1. Among the group of patients with ischemic optic neuropathy, 3 had elevated sedimentation and C-reactive protein levels, all of whom underwent temporal artery biopsy, and 2 were diagnosed with arteritic ischemic optic neuropathy (AION).

Table 1. Characteristics of patients with visual loss.

Characteristics	Value
Mean age±sd	72.10±5.65
Female	22
Permanent visual loss	38 (38.4%)
NAION	18 (18.2%)
Occipital CVD	4 (4.1%)
Cataract	4 (4.1%)
Atypical ON	3 (3.0%)
Retinal	3 (3.0%)
AION	2 (2.0%)
SMD	2 (2.0%)
Others	2 (2.0%)
Transient visual loss	10 (10.1%)
AF	5 (5.1%)
Migraine	4 (4.0%)
Unexplained	1 (1.0%)

NAION: Non-arteritic ischemic optic neuropathy, CVD: cerebro-vascular disorder, ON: optic neuritis, AION: anterior ischemic optic neuropathy, SMD: senil macular degeneration, AF: amaurosis fugax



Thirty-nine patients (23 F, 16 M) exhibited oculomotor symptoms. The mean age of these patients was 72.69±4.7 years. Female patients with oculomotor symptoms were marginally older than male patients with oculomotor symptoms (mean ages 73.91±3.9 and 70.94±5.3 years, respectively) (p=0.05). Diplopia was the most common oculomotor symptom, observed in 29 patients who had various final diagnoses. There was no difference between the group with individuals aged 65–74 years and that with those aged ≥75 years regarding the incidence of diplopia and ptosis (p=0.07). Five patients were diagnosed with myasthenia

gravis, based on symptoms of diplopia (1 patient) and ptosis (4 patients). MG was diagnosed on the basis of the results of single-fiber EMG; all MG patients were seropositive for acetylcholine receptor antibody. The most common cause of ptosis was age-related senile ptosis. Oculomotor abnormalities are summarized in Table 2.

Other symptoms were as follows: blepharospasm (n=4), scleral hyperemia (n=3), progressive supranuclear palsy (n=1), periorbital ecchymosis (n=1), diabetic papillopathy (n=1), trigeminal sensory neuropathy (n=1), and orbital mass (n=1).

Table 2. Characteristics of patients with ocular motor abnormalities.

Characteristics	Value
Mean age±sd	72.69±4.7
Female	23 (23.2%)
Diplopia	29 (29.3%)
4 th nerve palsy	10 (10.1%)
6 th nerve palsy	7 (7.1%)
3 rd nerve palsy	5 (5.1%)
Strabismus	3 (3.0%)
MG	1 (1.0%)
CCF	1 (1.0%)
Others	2 (2.0%)
Ptosis	10 (10.1%)
Senile	5 (5.1%)
MG	4 (4.0%)
Horner	1 (1.0%)

MG: Myasthenia Gravis , CCF: carotico-cavernous fistula

DISCUSSION

A retrospective review of geriatric patients was performed in a single center neuro-ophthalmology outpatient clinic. This study demonstrated that

among the geriatric population, the main cause of referral to the neuro-ophthalmology outpatient clinic was visual loss. Moreover, patients with permanent visual loss were older than those with transient visual loss.

Visual loss occurs due to various causes, which are mostly related to ocular diseases such as maculopathy, cataract, diabetic retinopathy, glaucoma, refractive errors, and ocular trauma (5, 6). Although visual loss is primarily ocular, it may occur as a result of a systemic disease, or in relation to a neurological condition, such as the underlying factors associated with AF. In elderly patients with complaints of monocular transient visual loss, physicians should consider vascular-occlusive diseases in the differential diagnosis.

Patients with AF experience sudden transient visual loss and exhibit normal recovery after the episode. The type of visual loss primarily depends on the type of ocular vascular-occlusive disorder. Unless the visual loss occurs as a result of branch vessel occlusion, the entire visual field is affected. Most patients describe painless monocular loss of vision to appear in a manner similar to that of a shade or curtain, lasting 1–5 min; generally, it is not accompanied with positive visual phenomena, such as photopsia or scintillating scotoma (7).

The primary causes underlying the onset of AF include transient impaction of an embolus in an artery, reduction in perfusion pressure (i.e., marked drop in mean arterial pressure, or increase in intraocular pressure), or thrombus in central or branch retinal veins.

A comprehensive study of AF showed that central vein occlusion with cilioretinal artery occlusion is the most common cause of AF (37.84%), whereas NAION is the least common cause (2.54%) (7). Five of 10 patients with transient visual loss exhibited AF; among these 5 patients, only 1 had an ulcerated carotid plaque. The rest of the patients demonstrated microvascular ischemic disease. No reciprocal association was observed between NAION and AF symptoms in our patients. Moreover, there was no sign of retinal vessel involvement. This may have been due to the small number of patients; alternatively, because the patients had been referred from the hospital's ophthalmology

outpatient clinic, AF related to retinal disease might have already been diagnosed.

Eighteen patients were diagnosed with NAION, with an episode of painless acute visual loss, optic disc edema, and altitudinal hemianopia. All of these patients demonstrated permanent visual loss, with final visual acuities below 20/100, as measured by Snellen cards. One patient underwent temporal artery biopsy due to the signs of systemic inflammation; importantly, the result was normal. Thirteen patients had at least 1 vascular risk factor for atherosclerosis. The most important concern for these patients was differentiation of NAION from AION. Both conditions show the same neuro-ophthalmological clinical picture, although in the presence of "red flags," giant cell arteritis-related AION should be considered. This is a medium and large-sized systemic vasculitis that is primarily observed in women and patients aged >50 years. It is often described as temporal arteritis due to its association with small-artery thickening under the temporal skin region. Temporal arteritis tends to involve the ophthalmic artery and its branches in the orbit (8). Recognition of temporal arteritis is essential; ION patients with a history of headache, jaw claudication, and elevated erythrocyte sedimentation rate/C-reactive protein level require immediate steroid treatment. Although steroid treatment does not reverse existing visual loss in the affected eye, it prevents further deterioration of the unaffected eye. The diagnosis is based on American College of Rheumatology giant cell arteritis criteria (9). At least 3 of the 5 criteria are required for a definitive diagnosis (Table 3). Histological features in biopsy are not affected by steroids even after 2 weeks of treatment, therefore no need to delay steroid treatment and wait for biopsy to be done (10). Arterial involvement is segmental, and the length of the biopsy specimen must be minimum 2 cm. In our geriatric group, 2 patients were diagnosed with AION via confirmed biopsy; these patients experiences severe vision loss, relative to that of the NAION group, which



was in accordance with the findings of previous reports (11).

Our NAION patients did not undergo steroid therapy or optic nerve decompression surgery. The only medical treatment in our group was low-dose acetylsalicylic acid. The Ischemic Optic Neuropathy Decompression Trial showed that optic nerve decompression surgery was not effective for NAION patients. In contrast, 42.7% of patients in the observation group who had visual acuity worse than 20/64 at presentation regained minimum 3 lines on the Snellen eye chart within 6 months (12). In our group, 10 of 18 NAION patients underwent long-term follow-up; 3 of these patients regained 2 lines in the Snellen chart, whereas the rest did not improve.

Although there is no clear relationship between medications and NAION, several medications, including phosphodiesterase type 5 inhibitors, amiodarone, nasal decongestants, and vasopressor agents have shown a potential for causing ischemic optic neuropathy (13-15). None of our patients reported these specific medications.

Patients with transient visual loss were younger ($p=0.02$), and most frequently had been affected by AF (5 patients). The second most common cause was migraine with aura (4 patients) (Table 1). While patients with AF demonstrated atherosclerotic risk factors, patients who had migraine with aura did not. Visual auras were fully reversible, typically last <1 h, gradually develop and disappear, and occur as flashing lights, zig-zags, and scintillating scotomas. Typical aura without headache was previously known as acephalgic headache; a typical migraine aura that is neither accompanied with, nor followed by headache occurs in 4% of migraine patients.(16).

Migraine is known as a disease of young people; those who experience migraines typically report their first attack in the first 3 decades of life. However, Late Onset Migraine Accompaniments (LOMA) is an established subtype of typical aura without headache; it manifests after 45 years of age

and is more common in elderly patients. Although LOMA can be sensorial, motor, or visual, the most common auras are visual (16, 17).

Only 1 migraine patient experienced visual symptoms without headache in our study group. This may have been due to the limited number of patients.

Oculomotor abnormalities were the second most common cause of referral to the neuro-ophthalmology outpatient clinic in our cohort; among the affected patients, diplopia was the main symptom, followed by ptosis. It is important to determine whether the diplopia is binocular or monocular. Monocular diplopia is related to the eye only and is not occur as a result of a neurological problem. All the study patients with diplopia had binocular diplopia; in 22 of 29 patients and resulted from oculomotor cranial nerve palsies (OMNP). As in previous reports, microvascular ischemia was the primary etiology observed in our OMNP patients; it manifested in 9 of 10 patients with fourth nerve palsy, 6 of 7 patients with sixth nerve palsy, and 3 of 5 patients with third nerve palsy. Microvascular oculomotor ischemia is a presumptive diagnosis based on a history of vascular risk factors, absence of neurological findings other than OMNP, and complete recovery within 3 months. It is controversial whether clinicians should observe affected patients for 3 months, or whether they should perform neuroimaging at the time of diagnosis (18, 19). In studies with a large number of patients, 50 years of age is accepted as a cut-off threshold; neurological imaging is not recommended for individuals older than this age (20). In our study cohort, all patients with OMNP underwent brain MRI at the time of admission; 2 patients with third nerve palsy were diagnosed with metastatic lung cancer and carotico-cavernous fistula, respectively, whereas 1 patient with sixth nerve palsy demonstrated an internal carotid aneurysm. Although this study involved a small number of patients aged >50 years, some exhibited life-threatening diagnoses. Therefore, and because of the reduced cost and increased

availability of MRI, physicians should consider early imaging in patients with OMNP. Additionally, MG can mimic fourth, sixth, and pupil-sparing third nerve palsies; importantly, the incidence of MG increases with the increase in age. Particularly among patients with an incomplete OMNP clinical picture, testing for MG is essential (21).

Orbital connective tissue can deteriorate in a manner similar to that of other body structures during the process of aging. Aponeurotic blepharoptosis and limited supraduction due to inferior displacement of horizontal rectus pulleys are notable examples of age-related ptosis and strabismus. Sagging eye syndrome is a relatively new term in the diplopia literature since 2009; in this syndrome, the lateral rectus muscle is inferiorly displaced due to age-related lateral rectus-superior rectus band degeneration (22). Heterophoria decompensation is another cause of diplopia; it may occur due to longstanding visual deprivation, such as cataract (23). When making these diagnoses, the primary consideration for a clinician is to first consider these diagnoses, and the second is to exclude other reasons of paralytic strabismus. In this retrospective study, none of the patients exhibited limited supraduction or sagging eye syndrome. This is the primary limitation of the study. The author of this manuscript was not familiar with sagging eye syndrome when these patients were admitted, and

orbital neuroimaging was not available for some of the patients. Notably, limited supraduction can be a finding of old age; however, if it was not considered in association with a disease, it may not have been recorded.

In this study cohort, there were 4 patients with homonymous hemianopia, which resulted from occipital infarction; however, there were no patients with higher visual cortical disorders, such as achromatopsia, simultanagnosia, or prosopagnosia. These symptoms are caused by damage to the extrastriate visual cortex and other vision-related temporoparietal areas. This is another limitation of the study, in that almost all the patients were referred from an ophthalmology clinic and these symptoms may not have been recognized by the referring clinicians. Even in stroke units, such symptoms may be overlooked because of other severe neurological findings. One point to emphasize is the importance of education in neuro-ophthalmological examination.

To the best of my knowledge, this is the first retrospective neuro-ophthalmological evaluation of a geriatric population in Turkey. Further prospective studies with a large number of patients, as well as a comparison with young patients, may better illustrate the etiologies present in geriatric patients.

Table 3. American College of Rheumatology classification criteria for giant cell arteritis (9). At least 3 of 5 criteria must be met.

i	Age at disease onset >50 years: development of symptoms or findings beginning at the age of >50 years
ii	New headache: new onset of or new type of localized pain in the head
iii	Temporal artery abnormality: temporal artery tenderness to palpation or decreased pulsation, unrelated to arteriosclerosis of cervical arteries
iv	Elevated erythrocyte sedimentation rate: 55 mm/hour by the Westergren method
v	Abnormal artery biopsy: biopsy specimen with artery showing vasculitis characterized by a predominance of mononuclear cell infiltration or granulomatous inflammation, usually with multinucleated giant cells



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AETIOLOGY, OUTCOMES AND PROGNOSIS OF PENETRATING KERATOPLASTY PERFORMED ON PATIENTS AGED ABOVE 65 YEARS

ABSTRACT

Introduction: The objective of this study is to evaluate indications, outcomes and prognosis in geriatric patients who underwent penetrating keratoplasty (PKP).

Materials and Method: 84 of 297 patients, who underwent PKP between January 2013-August 2016, were retrospectively analyzed. Age, gender, time between the onset of complaints and keratoplasty, duration of follow-up, other intraoperative-postoperative surgical procedures, complications, intraocular pressure (IOP), visual acuity were recorded. The data were statistically analyzed using paired-t test. $P < 0.05$ was considered to be significant.

Results: 84 eyes of 84 patients-49 (58.33%) male, 35(41.67%) female, mean age 65-83 (73.5 ± 10.8) years-were included in the study. PKP was performed due to pseudophakic bullous keratopathy (PBK) in 35 (41.67%) patients, corneal leukoma 27 (32.14%), post-traumatic corneal scar 8 (9.52%), graft failure 6 (7.14%), aphakic bullous keratopathy 5 (5.95%), corneal dystrophy 3 (3.57%). The most common indication was PBK (41.67%). 23 (65.71%) of the PBK patients had posterior chamber intraocular lens (IOL), 10 (28.57%) anterior chamber, 2 (5.71%) scleral fixation. The time between the onset of complaints and keratoplasty was 3-31 years. The mean duration of follow-up was 17.7 months. Intraoperatively, extracapsular cataract extraction+IOL implantation was performed on 13 (15.47%) patients, vitrectomy+lens extraction+IOL implantation 8 (9.52%), pupilloplasty 7 (8.33%), anterior chamber IOL extraction+anterior vitrectomy 6 (7.14%). Postoperatively, re-keratoplasty was performed on 9 (10.71%), secondary IOL implantation 8(9.52%), Ahmed glaucoma valve implantation 4(4.76%), phacoemulsification 3 (3.57%), resaturation 1 (1.19%). Postoperative graft failure was observed in 9 (10.71%) patients, glaucoma 8 (9.52%), cataract 3 (3.57%), endophthalmitis 2 (2.38%), traumatic wound dehiscence 1 (1.19%). Preoperative-postoperative visual acuity was 1.43 ± 0.76 , 0.40 ± 0.15 (logMAR), respectively ($p < 0.01$). Preoperative-postoperative IOP was 13.78 ± 6.50 mmHg, 16.01 ± 2.29 mmHg, respectively.

Conclusion: The most prevalent PKP indication in patients aged above 65 years was PBK; the results along with other surgical methods were quite satisfactory.

Keywords: Geriatrics; Keratoplasty, Penetrating; Prognosis

ARAŞTIRMA

65 YAŞ ÜZERİNDEKİ HASTALARDA UYGULANAN PENETRAN KERATOPLASTİNİN ETYOLOJİSİ, SONUÇLARI VE PROGNOZU

Öz

Giriş: Penetran keratoplasti uygulanan geriatric yaş grubundaki olgularda endikasyonların, sonuçların ve prognozun değerlendirilmesi.

Gereç ve Yöntem: Ocak 2013-Ağustos 2016 tarihleri arasında penetran keratoplasti(PKP) uygulanan 297 hastadan 84'ünün dosyaları retrospektif olarak incelendi. Yaş, cinsiyet, şikayetler ile keratoplasti arasındaki süre, takip süresi, intraoperatif, postoperatif diğer cerrahi uygulamalar, komplikasyonlar, göz içi basıncı (GİB) ve görme keskinliği kaydedildi. İstatistiksel analizlerde paired-t testi kullanıldı. $P < 0.05$ olması anlamlı kabul edildi.

Bulgular: Çalışmaya; 49'u (%58.33) erkek, 35'i (%41.67) kadın, yaşları 65-83 (73.5 ± 10.8) olan 84 hastanın 84 gözü dahil edildi. Hastaların 35'ine (%41.67) psödo-fakik büllöz keratopati(PBK), 27'sine (%32.14) korneal lökom, 8'ine (%9.52) travma sonrası korneal skar, 6'sına (%7.14) greft yetmezliği, 5'ine (%5.95) afakik büllöz keratopati, 3'üne (%3.57) korneal distrofi nedeniyle PKP uygulandı. En sık endikasyon PBK (%41.67) idi. PBK tanısıyla opere edilen hastaların 23'ünde (%65.71) arka kamara, 10'unda (%28.57) ön kamara ve 2'sinde (%5.71) skleral fiksasyonlu intraoküler lens (İOL) mevcuttu. Şikayetler ile keratoplasti arasındaki süre 3-31 yıldı. Postoperatif takip süresi ortalama 17.7 aydı. İntraoperatif 13 (%15.47) hastaya ekstrakapsüler katarakt ekstraksiyonu+İOL implantasyonu, 8 (%9.52) hastaya anterior vitrektomi+lens ekstraksiyonu+İOL implantasyonu, 7'sine (%8.33) pupilloplasti, 6'sına (%7.14) ön kamara IOL ekstraksiyonu+anterior vitrektomi uygulandı. Postoperatif 9 (%10.71) hastaya rekeratoplasti, 8(%9.52) hastaya sekonder İOL implantasyonu, 4 (%4.76) hastaya Ahmet glokom valf implantasyonu, 3 (%3.57) hastaya fakoemulsifikasyon, 1 (%1.19) hastaya resütürasyon uygulandı. Postoperatif komplikasyon olarak hastaların 9'unda (%10.71) greft yetmezliği, 8'inde (%9.52) glokom, 3'ünde (%3.57) katarakt, 2'sinde (%2.38) endoftalmi, 1'inde (%1.19) travmatik yara yeri ayrışması görüldü. Preoperatif görme keskinliği ortalama 1.43 ± 0.76 (logMAR), postoperatif ise 0.40 ± 0.15 ($p < 0.01$) idi. Preoperatif GİB ortalama 13.78 ± 6.50 mmHg, postoperatif 16.01 ± 2.29 mmHg idi.

Sonuç: Altmış beş yaş üzeri hastalarda en sık PKP endikasyonu psödo-fakik büllöz keratopati olarak tespit edilmiştir; diğer cerrahi yöntemlerle birlikte sonuçlar oldukça tatminkardır.

Anahtar sözcükler: Geriatri; Penetran keratoplasti; Prognoz



INTRODUCTION

Keratoplasty is an operation to replace a cornea with impaired transparency and/or geometry with a healthy cornea. Generally, it is performed for optical, tectonic, therapeutic, and cosmetic reasons. Keratoplasty can be performed for optical reasons in cases such as corneal nephelion and scar that obstruct vision, for tectonic reasons to ensure the integrity of globe following corneal perforation, for therapeutic purposes to cure corneal active infection or inflammation resistant to medical treatment, or for cosmetic purposes to fix impaired appearance of cornea even if it is not expected to achieve an improvement in vision (1).

Penetrating keratoplasty (PKP) is the most frequently and most successfully performed allograft tissue transplantation. Avascularity and immunologic advantages in cornea allows much higher success rates in corneal transplantations compared to other organ transplantations (2).

Primary indications for PKP are keratoconus, bullous keratopathy, scar or leukoma in cornea, corneal dystrophies and graft failure. In terms of PKP indications, corneal scars due to herpes simplex virus, opacities due to bacterial infections or traumatic events are more common compared to keratoconus and cornea dystrophies in the developing countries (3). Geriatric population is a separate clinical group in terms of corneal transplantation. The surgical indications differ compared to younger patients (4).

In PKP, cornea is extracted with all its layers and fully layered donor cornea is sutured in its place. Complications such as vitreous prolapses, suprachoroidal haemorrhage can be observed during the performance of this method due to open-sky operation, and problems can occur due to the traumatisation of graft endothelium. The success of PKP depends on many preoperative, intraoperative and postoperative factors such as healthy donor cornea, indications for operation, preferred saturation method, other operations performed and postoperative care (5).

Endothelial abnormalities are more common indications and keratoconus is a less common indication for surgery in the elderly compared to the young population. Eyes that undergo PKP usually have additional pathologies requiring surgery. When compared to the younger patient population, the possibility of other ocular diseases requiring surgery or previous surgical operation is higher in geriatric patients (4). Combined procedures such as cataract extraction and intraocular lens (IOL) implantation provide faster visual recovery than separately performed operations and prevent consecutive operations (6,7).

Despite a limited number of data on geriatric patients, there are many studies in the literature showing the clinical and demographic characteristics of patients who underwent corneal transplantation.

The objective of this study is to evaluate the indications of penetrating keratoplasty performed in geriatric patients aged above 65 years in our clinic and the outcomes and prognosis of penetrating keratoplasty and other combined operations.

MATERIALS AND METHOD

84 of 297 patients, who underwent PKP in Ataturk University Faculty of Medicine Eye Diseases Clinic between January 2013 and August 2016, were retrospectively analyzed. The study was conducted in compliance with the ethical principles of the Declaration of Helsinki. Detailed ophthalmologic examination was performed on all patients at postoperative week 1 and months 1, 6, 12 and 18. Intraocular pressure (IOP) was measured using a applanation tonometer (Haag Streit, Bern, Switzerland) or Tono-Pen (Reichert Inc, Buffalo, New York, USA). The operation was performed under general anaesthesia using flieringa rings 0.25-0.50 mm oversize graft, 10-0 nylon interrupted suture technique. Systemic antibiotics, topical steroids, topical antibiotics and autologous serum drops were initiated postoperatively. Age, gender, time between the onset of complaints and keratoplasty, duration of follow-up, other intraoperative and postoperative

surgical procedures, complications, IOP and best corrected visual acuity (BCVA) were recorded. Oedema and irreversible loss of transparency were accepted as graft failure. In average, half of the separated sutures were taken at month 12 and the other half were taken at month 18.

Statistical analysis

Descriptive and statistical analyses of the data were performed using SPSS version 21.0 software. The Paired-t test was used to compare pre- and post-treatment values. A p value < 0.05 was considered to be statistically significant.

Ethical considerations

The local ethic committee approval was obtained (2018/13-135).

RESULTS

84 eyes of 84 patients-49 (58.33%) male and 35 (41.67%) female were included in the study. The mean age of the patients was 65-83 (73.5±10.8) years. PKP was performed unilaterally on all patients (45 on right eye and 39 on left eye). PKP was performed due to pseudophakic bullous keratopathy in 35 (41.67%) patients, corneal leukoma in 27 (32.14%) patients, post-traumatic corneal scar in 8 (9.52%) patients, graft failure in 6 (7.14%) patients, aphakic bullous keratoplasty in 5 (5.95%) patients and corneal

dystrophy in 3 (3.57%) patients (Figure 1-4). The most common PKP indication was PBK (41.67%) (Table 1). 23 (65.71%) of the patients who were operated with PBK diagnosis had intraocular lens (IOL) with posterior chamber, 10 (28.57%) with anterior chamber and 2 (5.71%) with scleral fixation. The time between the onset of complaints and keratoplasty was 3-31 years. The mean duration of postoperative follow-up was 17.7 months. Intraoperatively, extracapsular cataract extraction+IOL implantation was performed on 13 (15.47%) patients, vitrectomy+lens extraction+IOL implantation on 8 (9.52%) patients, pupilloplasty on 7 (8.33%) patients and anterior chamber IOL extraction + anterior vitrectomy on 6 (7.14%) patients. Postoperatively, re-keratoplasty was performed on 9 (10.71%) patients, secondary IOL implantation on 8 (9.52%) patients, Ahmed glaucoma valve implantation on 4 (4.76%) patients, phacoemulsification on 3 (3.57%) patients, and resuturation on 1 (1.19%) patient (Table 2). As postoperative complications, graft failure was observed in 9 (10.71%) patients, glaucoma in 8 (9.52%) patients, cataract in 3 (3.57%) patients, endophthalmitis in 2 (2.38%) patients, and traumatic wound dehiscence in 1 (1.19%) patient (Table 3). The mean preoperative and postoperative BCVA was 1.43±0.76 and 0.40±0.15 (logMAR), respectively (p<0.01). There was a statistically significant difference found between preoperative and postoperative BCVA (p<0.01). The mean preoperative and postoperative IOP was 13.78±6.50mmHg and 16.01±2.29mmHg, respectively (Table 4).

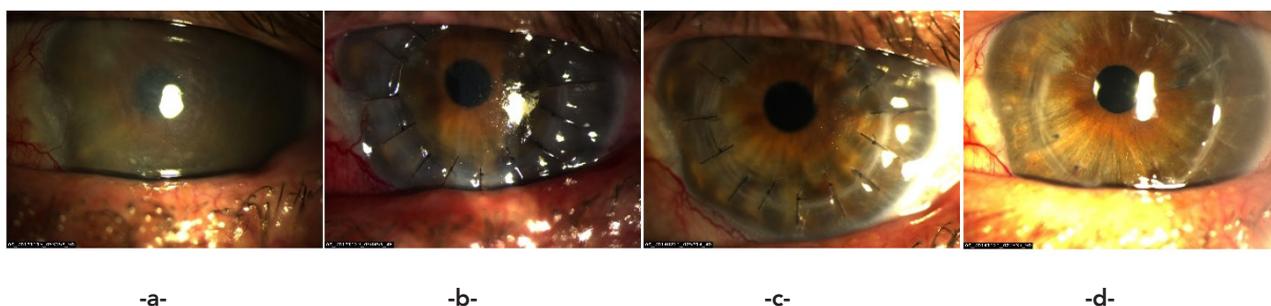
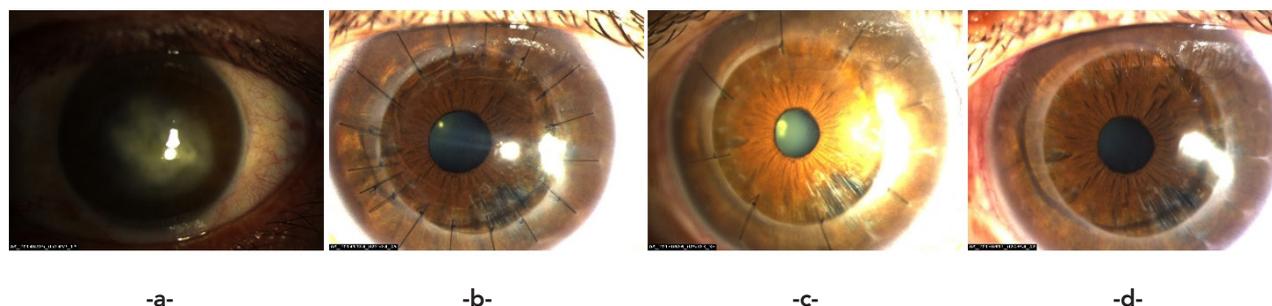


Figure 1. Left eye of a 77-year-old male patient. Following the cataract operation, pseudophakic bullous keratopathy developed; cornea with total oedema, posterior chamber lens (a). At week 1 after penetrating keratoplasty surgery; there are 360° separated 10/0 nylon sutures; graft is transparent (b). At postoperative month 6, sutures are intact; graft is transparent (c). At postoperative month 18, sutures are completely removed; graft transparency continues (d).



-a-

-b-

-c-

-d-

Figure 2. Left eye of a 72-year-old female patient. Large leucoma due to corneal abscess in the centre of cornea can be seen, pupillary distance is indistinguishable (a). At week 1 after penetrating keratoplasty surgery; there are 360° separated 10/0 nylon sutures; graft is transparent (b). At postoperative month 12; half of the sutures are removed; graft is transparent (c). At postoperative month 18, sutures are completely removed; graft transparency continues (d).



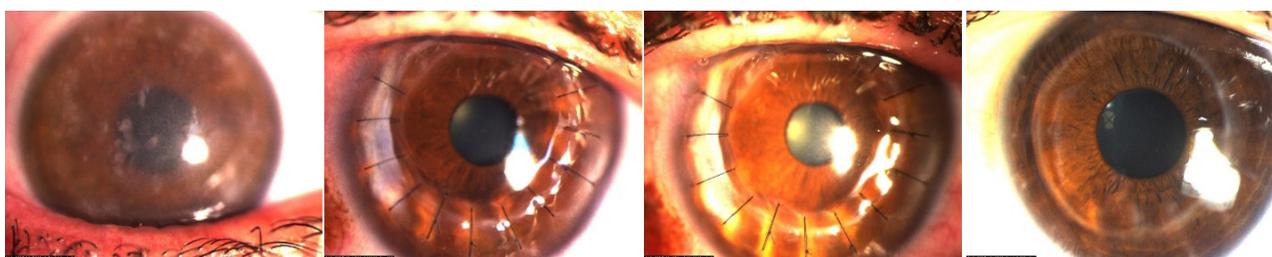
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Figure 3. Left eye of a 69-year-old male patient. Scar due to corneal perforation, ranging from the centre of cornea to the upper half can be seen (a). At week 1 after penetrating keratoplasty surgery; there are 360° separated 10/0 nylon sutures, graft is transparent (b). At postoperative month 6, sutures are intact, graft is transparent (c). At postoperative month 18, sutures are completely removed, graft transparency continues (d).



-a-

-b-

-c-

-d-

Figure 4. Right eye of a 66-year-old female patient. Cornea with oedema and stromal corneal dystrophy with opacities (a). At week 1 after penetrating keratoplasty surgery; there are 360° separated 10/0 nylon sutures, graft is transparent (b). At postoperative month 6, sutures are intact, graft is transparent (c). At postoperative month 18, sutures are completely removed, graft transparency continues (d).

Table 1. Distribution of Penetrating Keratoplasty Indications.

Indication	Number of eyes with PKP	%
Pseudophakic bullous keratoplasty	35	10.71
Corneal leukoma	27	32.14
Corneal scar	8	9.52
Graft failure	6	7.14
Aphakic bullous keratopathy	5	5.95
Corneal dystrophy	3	3.57
Total	84	100.0

Table 2. Other intraoperative and postoperative operations.

Operation	Intraoperative	Postoperative	%
Extracapsular cataract extraction (ECCE) + IOL implantation	13		15.47
Phacoemulsification		3	3.57
Secondary IOL implantation		8	9.52
Anterior vitrectomy + lens extraction + IOL implantation	8		9.52
Anterior chamber IOL extraction + anterior vitrectomy	6		7.14
Pupilloplasty	7		8.33
Ahmed glaucoma valve		4	4.76
Resuturation		1	1.19
Total	34	16	

Table 3. Complications after Penetrating Keratoplasty (PKP).

Complication	Number	%
Graft failure	9	41.67
Glaucoma	8	9.52
Cataract	3	3.57
Endophthalmitis	2	2.38
Traumatic wound dehiscence	1	1.19



Table 4. Demographic characteristics and examination findings of the patients.

Characteristics	
Male	49
Female	35
Total number of patients	84
Age (mean±sd)	73.5±10.8
Right eye	45
Left eye	39
Time between the onset of complaints and PKP	3-31 years
Duration of postoperative follow-up	17.7 months
Preoperative BCVA	0.041±0.07
Postoperative BCVA	0.39±0.71
Preoperative IOP	13.78±6.50 mmHg
Postoperative IOP	16.01±2.29 mmHg

DISCUSSION

Although many new corneal transplantation methods such as deep anterior lamellar keratoplasty (DALK), descemet stripping automated endothelial keratoplasty (DSAEK) have many advantages over PKP, PKP is still the most common corneal transplantation method (5).

Despite a limited number of data on geriatric patients who underwent PKP, there are many studies in the literature regarding PKP indications, patient demographic and clinical characteristics and prognosis. The surgical indications of the geriatric patients differ compared to younger patients (3-5,8).

Indication rate for keratoplasty differs based on the socioeconomic status and regional location of the countries (9). Although keratoplasty operations particularly due to keratoconus and

aphakic corneal oedema were common before the 1970s, pseudophakic bullous keratopathy (PBK) became one of the most common indications with the increase of cataract extractions and lens implantations after 1980s and its prevalence continues to increase (10).

In the study by Boimer et al. (11) on a series of 7,755 keratoplasties in patients with a mean age of 69 years (ranging from newborns to 99-year-old patients) in Canada, the most common keratoplasty indications were PBK (28.3%), graft failure (21.5%), Fuchs endothelial dystrophy (16.6%) and keratoconus (13.8%).

In the study by Dobbins et al. (12) on 4,217 patients with an mean age of 67 years, who underwent penetrating keratoplasty, in the midwest of USA, the most common indication was PBK (31.5%) followed by Fuchs endothelial

dystrophy (23.2%), keratoconus (11.4%), corneal scars (11.2%), graft failure (8.9%) and aphakic bullous keratopathy (7.5%).

In our study, the most common PKP indication was PBK (41.67%). Although not all patients were geriatric in the studies by Boimer et al. (11) and Dobbins et al. (12), the mean age was above 65 years, and the most common indication was PBK as in our study.

In the study by Altay et al. (13) on 548 patients with an average age of 38.49 years, who underwent PKP in Ankara, 34.1% of the patients had keratoconus, 17% had bullous keratopathy, 13.3% had non-herpetic corneal infectious scar, 12.8% had traumatic corneal scar, 12.2% had herpetic corneal scar, 4.4% had graft failure and 4.9% had corneal dystrophy. In our study consisting of geriatric patients, the fact that keratoconus was not an indication is due to keratoconus which is observed in a younger population (14).

Duman et al. (4) performed keratoplasty on 271 eyes of 253 patients aged above 65 years in Wills Eye Centre (Wills Eye Institute Philadelphia, USA) and reported that the most common indication was Fuchs endothelial dystrophy (41%) followed by PBK (26%), graft failure (18%), corneal scar (8%), other corneal dystrophies (3%) and trauma (1%). Similar to our study, Duman et al. included patients aged 65 and above, however the most common indication was fuchs endothelial dystrophy, whereas this was PBK in our study. We believe that this difference is caused by the difference of the regions and the genetic demographics as stated by Dobbins et al. (12) and Ono, et al. (14).

Ono et al. (14) reported the indications of 509 PKP cases with an average age of 68.9 years in Japan in 2017 to be corneal leukoma (42%), bullous keratopathy (27%), graft rejection (16%) and keratoconus (6.7%), and stated that corneal leukoma secondary to infectious keratitis being the most common indication is caused by regional differences.

In 2013, Bajracharya et al. (15) performed keratoplasty on 645 eyes of patients with an average age of 41.7 years in Nepal and reported the indications to be infective keratitis (40.9%), corneal leukoma (26.8%), graft rejection (11.2%), bullous keratopathy (9.0%), keratoconus (7%), corneal dystrophy (1.7%). In another study by Módis et al. (16) in Hungary, the indications of keratoplasty were reported to be corneal scar (24.9%), graft failure (18.6%), keratoconus (18.6%), pseudophakic/aphakic bullous keratopathy (12%), stromal corneal dystrophies (6%), non-infectious keratitis (4.7%) chemical injuries (3.3%), corneal degenerations (3%), mechanical trauma (1.7%), infectious keratitis (1.4%), endothelial corneal dystrophies (1.3%) and others (4.5%), respectively.

In our study including 84 geriatric patients who underwent PKP, the reason for PKP was PBK in 35 (41.67%) patients, corneal leukoma in 27 (32.14%), post trauma corneal scar in 8 (9.52%), graft failure in 6 (7.14%), aphakic bullous keratopathy in 5 (5.95%), corneal dystrophy in 3 (3.57%). PBK was detected as the most prevalent indication in our study with a rate of 41.67%.

In many series, the most common indications for corneal transplantation are similar in younger and older patients, outside of PBK becomes more common, and keratoconus much less common, in elderly patients (8-10). Fasolo et al. (17) and Pan et al. (18) have the youngest age group; they found keratoconus to be the most common indication. When compared to the other series including all ages; in our study with elderly patients PBK was the most common indication, and there were no keratoconus patients.

Dobbins et al. (12) stated that PBK was the most common indication but with a tendency of being less prevalent and attributed this to the developments in cataract surgery methods and IOP technology, the use of viscoelastics and the decreased intraoperative surgical complications. They stated that out of the patients, who underwent



PKP due to PBK, 73% had anterior chamber IOL, 21% had posterior chamber IOL and 6% had iris-fixated IOL.

In our study, out of the patients, who were operated with PBK diagnosis, 23 (65.71%) had posterior chamber, 10 (28.57%) had anterior chamber, and 2 (5.71%) had scleral-fixated IOL. Anterior chamber IOL location is not the only risk factor for PBK formation. Other risk factors such as low endothelium cell count, cornea guttate, previous intraocular surgery, chronic uveitis, intraoperative trauma, drug toxicity, peripheral anterior synechia and narrow anterior chamber have also an effect on the development of PBK (12).

Corneal pathologies can be accompanied by many ocular diseases in patients requiring PKP. The possibility of previous anterior segment surgery and other ocular diseases like anterior iris synechiae, vitreous adhesions, accompanying the existing pathology requiring PKP is very high particularly in geriatric patients than younger patients (4).

Procedures combined with PKP such as cataract extraction and IOL implantation provide better visual recovery compared to separately performed operations and prevent the increased number of operations (6,7).

Duman et al. (4) performed PKP, anterior vitrectomy and IOL exchange in 18% and a triple procedure (PKP, ECCE, and IOL implantation) in 14% of the 135 patients aged above 65 years who underwent PKP.

Sridhar et al. (19) performed a triple procedure (PKP, ECCE, and IOL implantation) in 104 patients and came to the conclusion that it is a safe surgical operation with transparent graft and satisfactory visual recovery.

Bajracharya et al. (15) performed ECCE and posterior capsule IOL implantation combined with PKP in the same session in 76.2%, secondary IOL

implantation in 7.14% and ECCE in 3.97% of 560 eyes.

Green et al. (20) compared the cataract extraction and IOL implantation combined with PKP with PKP alone and found similar graft rejection and cornea transparency rates. Thus, they stated that secondary or tertiary operations required to be combined with PKP provide more satisfactory and faster visual correction.

In our study, we performed ECCE+IOL implantation in 13 (15.47%) patients, anterior vitrectomy + lens extraction+IOL implantation in 8 (9.52%) patients, pupilloplasty in 7 (8.33%) patients, anterior chamber IOL extraction + anterior vitrectomy in 6 (7.14%) patients in combination with PKP in the same session. These additional operations, performed in the same session as PKP, decrease the number of operations and thus increase the patient compliance and comfort. Corneal pathologies requiring PKP, particularly cataract, can be accompanied by many intraocular diseases in elderly patients. We believe that PKB, if required, should be combined with other intraocular surgeries for faster visual recovery.

Many complications can be observed after PKP. Graft failure, secondary glaucoma, cataract, peripheral anterior synechia, fibrin reaction in anterior chamber, posterior capsular haze, graft infiltration, posterior chamber IOL decentralization, wound dehiscence, endophthalmitis, persistent epithelial defect, cystoid macula oedema, retinal detachment can be considered as some of these complications. Rahman et al. (5) evaluated the postoperative complications of 203 patients who underwent PKP in England and found graft failure in 18%, glaucoma in 18%, microbial keratitis in 8% of the patients. In the study by Eifring et al. (21), the prevalence of post-PKP endophthalmitis was reported to be 0.08%. Yildirim et al. (22) reported that glaucoma, graft failure and postoperative infection developed after PKP in 34%, 17% and 10% of the patients, respectively.

A greater probability and severity of systemic diseases and use of many systemic medications may also influence the follow-up and compliance of geriatric patients compared to younger cohorts. Cooperation and compliance with postoperative medications affect the success of corneal transplantation and may be lower in geriatric patients. The immune system declines with increasing age (23). Also, age may effect wound healing, immunologic response, and the incidence of intraoperative and postoperative complications. Nevertheless in studies published in the literature, young recipient age is associated with a higher rate of failure from rejection (4,24).

Pan et al. (18) had the youngest study group, with mean age of 41.5 years, and found 21.2% graft failure rates after PKP with a mean follow-up period of 25.5 months.

In our study greft failure rate (10.71%) was found to be lower in older patients aged 65-83, compared to the studies with young patients.

The risk of rejection is increased in regrafts and in eyes with several conditions such as previous anterior segment surgery, uveitis, keratitis, anterior iris synechiae, vitreous adhesions, and multiple surgeries at the same time (17). Even though glaucoma does not certainly predispose to rejection, it is an substantial risk factor for graft failure (18).

In our study, the postoperative complications observed were graft failure, glaucoma, cataract, endophthalmitis and traumatic wound dehiscence in 9 (10.71%), 8 (9.52%), 3 (3.57%), 2 (2.38%) and 1 (1.19%) of the patients, respectively.

Since it is performed on the patients with low vision, the outcomes of PKP in terms of level of vision are quite satisfactory.

In the study by Tabin et al. (25) on 472 PKB patients, BCVA level at postoperative month 6 was found to be 6/18 or better, 6/18 to 6/60 and 6/60 to 3/60 in 15%, 37% and 17.7% of the patients, respectively.

In the study by Yildirim et al. (22) PKP was performed on 80 eyes and the mean preoperative and postoperative BCVA level was 2.13 ± 0.16 and 1.17 ± 0.85 , respectively. In our study, the mean preoperative and postoperative BCVA level was 1.43 ± 0.76 and 0.40 ± 0.15 , respectively.

We found a statistically significant difference between preoperative and postoperative BCVA levels ($p < 0.01$).

Geriatric patients are a fast-growing population group around the world. Geriatric patients, whose many characteristics are different to the general patient population, constitute a separate clinical group in terms of cornea transplantation. Their surgical indications, demographic and clinical characteristics are different from younger patients. The possibility of the geriatric patients having a history of eye surgery or other ocular diseases accompanying the current pathology is high (4).

There have been many published reports on demographic and clinical outcomes of patients after corneal transplantation, but there are limited published data on older patients. To the best of our knowledge, our study is one of the few studies in the literature that specifically analyzes the indications, outcomes and prognosis of keratoplasty surgery in the elderly.

Endothelial abnormalities are more common indications and keratoconus is a less common indication for surgery in the elderly compared to the young population.

The most common PKP indication in the patients aged above 65 years was PBK. When performed in combination with other surgical methods, its outcomes are quite satisfactory. We believe that it is appropriate for PKP to be combined with other intraocular operations, when necessary, because it decreases the number of operations, increases the patient satisfaction and comfort and provides faster visual recovery.

Conflicts of interest

The authors declare no conflict of interest.



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RESEARCH

THE RELATIONSHIP OF EXERCISE CAPACITY WITH FAT-FREE MASS AND BODY MASS INDEX IN ELDERLY PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

ABSTRACT

Introduction: Skeletal muscle weakness is a major systemic manifestation of chronic obstructive pulmonary disease (COPD). Loss of muscle mass contributes to impaired exercise capacity and peripheral muscle weakness and manifests as reduced fat-free mass in patients with COPD. This study aimed to examine the effects of fat-free mass, body mass index and airway obstruction severity on exercise capacity.

Materials and Method: This study included 70 patients with COPD and 70 healthy individuals. Patients with COPD were divided into two groups: non-severe (GOLD Stage 1,2) and severe (GOLD Stage 2,3). Body mass index, fat-free mass, fat mass and percentage fat mass were measured, and pulmonary function tests were performed for all participants. The six-minute walk test was used as an index of exercise capacity. The Student's t-test, chi-square test and Pearson's correlation coefficient were used to compare study parameters.

Results: The average fat mass, percentage fat mass and six-minute walk test were reduced in the COPD cohort. No significant correlations were found between the six-minute walk test and body mass index, fat-free mass, fat mass and percentage fat mass. A significant correlation was found between the six-minute walk test and forced expiratory volume in one second (FEV1), forced vital capacity (FVC) and FEV1/FVC in patients with non-severe COPD.

Conclusion: Exercise capacity is significantly reduced in patients with COPD. The significant relationship between the six-minute walk test score and pulmonary function test variables indicates that disease-related obstruction affects exercise capacity.

Keywords: Exercise; Body mass index; Pulmonary Disease, Chronic Obstructive

ARAŞTIRMA

KRONİK OBSTRÜKTİF AKCİĞER HASTALIĞI OLAN YAŞLI HASTALARDA EGZERSİZ KAPASİTESİNİN BEDEN KÜTLE İNDEKSİ VE YAĞSIZ BEDEN KÜTLE İNDEKSİ İLE OLAN İLİŞKİSİ

Öz

Giriş: İskelet kas güçsüzlüğü, KOAH'ın temel sistemik belirtilerinden birisidir. KOAH'da bozulmuş egzersiz kapasitesi ve periferik kas zayıflığına belirgin olarak katkıda bulunan kas kütlesi kaybı, yağsız beden kütle indeksi (YBKİ) azalma aracılığıyla gösterilebilir. KOAH'lı hastalarda YBKİ ve beden kütle indeksi (BKİ) ile hava yolu obstrüksiyon şiddetinin egzersiz kapasitesi üzerinde etkisini incelemektir

Gereç ve Yöntem: Çalışmamıza 70 KOAH hastası ve 70 sağlıklı birey değerlendirmeye alınmıştır. KOAH ağır olmayan (GOLD Evre 1-2) ve ağır olan (GOLD Evre 2,3) olarak iki gruba ayrıldı. Hastaların BKİ, YBKİ, beden yağ kütlesi (BYK), BYK yüzdesi ölçüldü. Egzersiz kapasitelerini belirlemek için Altı dakika yürüme testi (6-DYT) yapıldı. Parametrelerin karşılaştırmalarında Student t testi, Ki-Kare testi ve Pearson korelasyon analizi kullanıldı. p<0.05 ise anlamlı kabul edildi.

Bulgular: Çalışmamızda hastaların VYK ölçüm ortalaması, VYK yüzde düzeyi, 6 DYT düşük tespit edildi. 6-DYT ile BKİ, YBKİ, BYK ve BYK yüzdesi arasında anlamlı ilişki saptanmadı. Ağır olmayan KOAH grubunda 6-DYT ile FEV1, FVC yüzdesi ve FEV1/FVC arasında anlamlı ilişki saptandı.

Sonuç: 6-DYT testinin hasta grubunda daha düşük saptanması KOAH'lı hastalarda egzersiz kapasitesinin etkilendiğini göstermektedir. Ayrıca 6DYT ile solunum fonksiyon testleri arasındaki anlamlı ilişki bize egzersiz kapasitenin obstrüksiyondan etkilendiğini göstermektedir

Anahtar Sözcükler: Egzersiz; Beden kütle indeksi; Akciğer hastalığı, Kronik obstrüktif



INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a chronic disease characterised by progressive airway obstruction, which causes reduced exercise capacity and poor health-related quality of life. COPD is a systemic disease that is often accompanied by weight loss, decreased muscle mass, decreased functional capacity, anaemia and osteoporosis (1). In patients with COPD, malnutrition and subsequent reductions in protein synthesis lead to decreased fat mass (FM) and muscle mass, independent of pulmonary function. Malnutrition restricts exercise capacity by diminishing the force-generating capacity of skeletal muscles such as the diaphragm and other accessory respiratory muscles (2). Symptoms that reduce exercise capacity usually present during physical activities. Assessing exercise capacity is important for determining a patient's prognosis and creating and following an appropriate treatment plan. For this reason, exercise tests are used during pre- and post-treatment evaluations for patients with COPD and for determining physiological and subjective responses to exercise (3-4). The six-minute walk test (6-MWT) is widely used to assess exercise capacity in patients with COPD. The 6-MWT is safe, inexpensive and requires no special equipment. The general and combined responses of pulmonary, cardiovascular and muscular system components are assessed by the 6-MWT, which reflects functional exercise capacity during daily physical activities (5).

Pulmonary function test (PFT) impairments and exercise capacity restrictions are detected at varying severity levels in patients with COPD, depending on the disease duration and severity. Recent studies indicated that body mass index (BMI) was associated with mortality in patients with COPD (6).

The present study aimed to examine the effects of fat-free mass (FFM), BMI and airway obstruction severity on exercise capacity in elderly patients with COPD.

MATERIALS AND METHOD

This study included a total of 140 participants, including 70 patients diagnosed with COPD according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2014 criteria and 70 healthy controls.

Pulmonary function test and arterial blood gas (ABG) values were recorded for each participant. COPD severity was classified as one of four stages according to post-bronchodilator forced expiratory volume in one second (FEV1) based on GOLD 2014 criteria (7). Patients with GOLD stage 1 and 2 disease were classified as having non-severe COPD and those with GOLD stage 3 and 4 were classified as having severe COPD. All participants completed the 6-MWT to evaluate exercise capacity.

The next day, the height and weight of each participant was measured. Body weight was determined using a calibrated digital scale with a sensitivity of 0.1 kg before a meal and after removing shoes and outerwear. Height was measured using a metre stick with a sensitivity of 0.01 m. The stick was fixed on the wall, and height was determined after the participant was instructed to remove his or her shoes (including accessories such as hair ties as appropriate) and stand with straight back and shoulders, looking straight ahead parallel to the floor with feet slightly apart and legs straight. Other variables of interest included BMI, FFM, FM and percentage fat mass (%FM) measured with the TANITA body composition analyser (TBF-300, Tokyo, Japan). All measures were taken between 8 and 10 AM, following an overnight fast without intake of food or fluids and after defaecation. Participants were instructed to wear light clothing, and the measures were taken with bare feet and no shoes and socks. BMI was classified according to the World Health Organization criteria (8) as shown in Table 1, and percentage fat mass was classified as previously described (9) in Table 2.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics 20 (IBM SPSS, Turkey) software.

Apart from descriptive statistics (mean, standard deviation and frequency), the Student's *t*-test was used to compare normally-distributed, quantitative variables. The chi-square test and continuity (Yates) correction were used to compare qualitative

variables. The Pearson's correlation coefficient was used to examine relationships between normally-distributed variables. $P < 0.05$ was considered to be statistically significant.

Table 1. Body Mass Index.

BMI values (kg/m ²)	Classification
Below 18.5 kg/m ²	Weak
Between 18.5-24.9 kg/m ²	Normal weight
Between 25-29.9 kg/m ²	Overweight
Between 30-34.9 kg/m ²	1. Grade obese
Between 35-39.9 kg/m ²	2. Grade obese
Over 40 kg/m ²	3. Grade morbit obese

BMI: Body weight (kg) / height (m²)

Table 2. Fat mass percentage.

Classification	Male	Women
1-Underweight	<8	<15
2-Healthy	8-15	15-22
3-Slightly overweight	16-20	23-26
4-Overweight	21-24	27-32
5-Very overweight	>25	>32

RESULTS

This study included 140 participants [69 (49.3%) males and 71 (50.7%) females] with a mean age of 65.51 ± 11.25 years. Demographic characteristics of all participants are shown in Table 3.

All PFT sub-parameters, ABG values (PCO₂, PO₂ and SO₂), body composition values (FM and %FM) and the 6-MWT results were significantly lower in patients with COPD than in healthy controls (Table 4).

For patients with non-severe COPD, a positive and significant correlation was observed between the 6-MWT and weight ($p=0.026$) (Table 5). Furthermore, a positive and significant correlation was observed between the 6-MWT and FEV1 ($p=0.002$), FVC ($p=0.011$) and FEV1/FVC ($p=0.048$).

For patients with severe COPD, a positive and significant correlation existed between the 6-MWT and FEV1 and FVC (Table 6).



Table 3. Demographic characteristics of patients and control group.

	Patient	Control	p
¹ Age _{mean±sd}	65.51±11.25	62.41±8.59	0.071
² Gender _{n,%}			
Women	27 (%38.6)	26 (%37.1)	0.074
Men	43 (%61.4)	44 (%62.7)	
¹ Height _{mean±sd}	163.27±9.67	162.09±8.61	0.445
¹ Weight _{mean±sd}	76.39±14.24	80.16±13.1	0.106
¹ BMI (kg/m ²) _{mean±sd (median)}	28.79±5.66	30.66±5.47	0.048*
² BMI class _{n,%}			
Underweight	1 (%1.4)	0 (%0)	0.338
Normal	14 (%20)	9 (%12.9)	
Overweight	27 (%38.6)	27 (%38.6)	
Obese class 1	19 (%27.1)	20 (%28.6)	
Obese class 2	8 (%11.4)	8 (%11.4)	
Morbid obese	1 (%1.4)	6 (%8.6)	

¹Student t Test ²Chi-Square Test *p<0.05 **p<0.01

Table 4. Evaluation of the ABG, PFT, Body Composition and 6 MWT results of the patients and control group.

	Patient mean±sd	Control mean±sd	p
Pulmonary Function Test			
¹ FEV1%	54.84±21.8	101.16±15.92	0.001
¹ FEV1 LT	1.37±0.63	2.72±0.71	0.001
¹ FVC%	74.81±23.98	106.36±16.21	0.001
¹ FVC LT	2.31±0.93	3.45±0.94	0.001
¹ FEV1/FVC	57.94±10.12	79.66±5.38	0.001
Arterial Blood Gas			
¹ pH	7.41±0.04	7.4±0.03	0.558
¹ PO ₂	62.75±15.44	79.38±5.89	0.001
¹ PCO ₂	36.96±7.99	39.46±3.11	0.017
¹ SO ₂	90.01±8.5	96.43±1.33	0.001
¹ HCO ₃	23.11±4.68	23.6±1.84	0.412
Body Composition and 6 MWT			
¹ FFM	52.48±8.74	52.27±8.76	0.890
¹ FM	23.91±10.65	27.89±10.71	0.029
¹ FM percentage	30.28±10.26	34.21±9.9	0.023
¹ 6 MWT	360.13±155.84	560.09±113.49	0.001

¹Student t Test

Table 5. The correlation of the 6 MWT with parameters according to the degrees of severity of the patient group.

	6 MWT			
	Non-severe COPD		Severe COPD	
	r	p	r	p
Weight	0.347	0.026*	0.180	0.351
BMI	-0.301	0.056	0.012	0.951
FFM	0.100	0.533	0.150	0.437
FM	-0.161	0.314	0.007	0.973
FM percentage	-0.129	0.422	0.004	0.986

Pearson Correlation Analysis *p<0.05

Table 6. Comparison of the 6 MWT and PFT according to the degrees of severity of the patient group.

	6 MWT			
	Non-severe COPD		Severe COPD	
	r	p	r	p
FEV1%	0.274	0.083	0.457	0.013
FEV1 LT	0.470	0.002**	0.515	0.004
FVC %	0.200	0.209	0.540	0.003
FVC LT	0.399	0.011*	0.583	0.001
FEV1/FVC	0.305	0.048*	0.003	0.986

Pearson Correlation Analysis

DISCUSSION

Dyspnoea, inadequate food intake due to difficulty in digesting food, malnutrition and excessive skeletal muscle apoptosis due to systemic inflammation are hallmark symptoms of COPD (10). With disease progression, these factors interfere with energy generation, and body weight is frequently reduced. Reductions in body weight are frequently accompanied by reduced skeletal muscle mass (10). In patients with COPD, exercise capacity is reduced due to increased airway resistance; decreased respiratory and peripheral muscle strength and impairment of lung mechanics,

metabolic pathways, gas exchange and cardiac performance (11). Previous studies have indicated that exercise capacity is reduced in patients with COPD and that there is a positive correlation between BMI and exercise capacity (12). Casanova et al. noted that the 6-MWT distance is a better measure of mortality than FEV1 and BMI in patients with severe COPD (13). The relationship between the 6-MWT distance and mortality for patients with COPD was investigated by Cote et al. The authors have found that mortality significantly increased when the 6-MWT distance decreased below 350 m and have emphasised the prognostic significance



of this distance (14). Savcı et al. found a correlation between the 6-MWT distance and BMI in patients with severe COPD (15). Bautista et al. compared functional lung capacity in 10 obese ($BMI \geq 35 \text{ kg/m}^2$) and 10 non-obese ($21 \leq BMI \leq 30 \text{ kg/m}^2$) patients with COPD who exhibited similar airway limitations (16). At the end of the study, they found that the 6-MWT distance was significantly lower for obese patients with COPD (16). In another study, patients who were obese exhibited significantly higher functional lung capacities compared with those of individuals with normal weight. In the present study, a positive correlation was found between BMI and exercise capacity.

It has been stated that higher functional lung capacity is attributable to higher FFM (17). However, Gümüş et al. found no correlation between BMI and the 6-MWT (18). Sağlam et al. did not find a significant difference the 6-MWT between overweight and obese ($25 \leq BMI \leq 34.9 \text{ kg/m}^2$) patients with COPD and normal-weight patients ($18.5 \leq BMI \leq 24.9 \text{ kg/m}^2$) (10). In agreement with published findings, the findings of our study revealed that the 6-MWT distance was significantly lower in patients with COPD than in healthy controls. At the same time and in line with other studies, no correlation was observed between BMI and the 6-MWT.

It has been reported that underweight patients can exhibit decreased diaphragmatic muscle mass and thickness. A positive correlation has been found between FFM and respiratory muscle strength in patients with COPD (19). FFM is an important contributor to peripheral muscle strength. It is believed that more FFM protects respiratory muscle strength in overweight/obese patients with COPD (11). Devenci et al. found that FFM was significantly lower in patients with COPD than in controls and observed a positive correlation between FFM and the 6-MWT (20). A correlation was not found between the 6-MWT and FFM or FM in our study.

Patients with COPD typically experience increasingly severe airway obstruction and

worsening of symptoms, such as dyspnoea and fatigue, as the disease progresses (21,22). Chronic damage caused by COPD can ultimately affect activities of daily living (23). Uçar et al. found that the average 6-MWT distance was $384.71 \pm 73.27 \text{ m}$ (244–498 m), which had a positive but weak correlation with FEV1 and FEV1/FVC (24). In a study of 65 patients with COPD, Savcı et al. found a significant correlation between percent FEV1 and the 6-MWT only among patients with COPD and severe obstruction (15). In a study of 60 stable patients with COPD, Clarice et al. found that the 6-MWT distance showed a linear correlation with percent FVC, percent FEV and percent FEV1/FVC (25). Gümüş et al. found a positive correlation among FEV1, FVC and the 6-MWT (18). While investigating which PFT parameters best reflected maximal exercise capacity, Chlumsky et al. found that the total 6-MWT distance positively correlated with FEV1 and FEV1/FVC (25). In our study, a positive and significant correlation was found between the 6-MWT and FEV1 and FVC in patients with COPD; this finding is in agreement with literature.

The strength of this study is the significant relationship between the exercise capacity and PFT variables indicates that disease-related obstruction affects exercise capacity to a greater extent than body composition. The weakness of this study is the low number of cases.

In conclusion, exercise capacity is significantly reduced in patients with COPD. The significant relationship between the 6-MWT score and PFT variables indicates that disease-related obstruction affects exercise capacity to a greater extent than body composition. This shows us that we can protect exercise capacity by reducing the rate of PFT decline in elderly patients with COPD.

Conflicts of interest

The authors declare no conflict of interest in preparing this article

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RESEARCH

CLINICAL AND LABORATORY FINDINGS OF SEPTIC ARTHRITIS OF THE KNEE IN GERIATRIC AGE GROUP

ABSTRACT

Introduction: Septic arthritis of the knee is a serious disease usually caused by bacterial infection. Although this disease is not age-restricted, many cases involve elderly people and young children. The present study evaluated the clinical and laboratory findings of patients aged ≥ 65 years who underwent surgery for diagnosed septic arthritis of the knee.

Materials and Method: We retrospectively reviewed all patients' preoperative demographic data and comorbidities, as well as preoperative and postoperative clinical and laboratory findings. All patients were followed postoperatively at the 3rd and 6th weeks and 6th month and until a mean final follow-up of 36.0 ± 21.6 (12–95) months.

Results: This retrospective clinical study included 56 patients (34 men, 22 women) who underwent surgery during 2010–2017. The mean age and body mass index (kg/m^2) were 77.3 and 27.6, respectively. In 43 patients (76.8%), at least one infectious agent could be isolated from joint debridement material. The most commonly isolated bacterium was *Staphylococcus aureus* (28 patients, 50%). Between all follow-up time points, we observed statistically significant decreases in C-reactive protein levels and erythrocyte sedimentation rates (both $p < 0.001$), well as significant increases in SF-36 scores ($p < 0.001$). Furthermore, visual analog scale scores decreased significantly between all follow-up time points ($p < 0.001$) except between the 6th postoperative month and final follow-up ($p = 0.021$).

Conclusion: Geriatric septic arthritis should be operated early. During postoperative empirical antibiotherapy, kidney function tests should be performed regularly. Further research is required for optimal management of geriatric knee SA.

Keywords: Geriatrics; Knee; Arthritis, Infectious; Therapeutics

ARAŞTIRMA

GERİATRİ YAŞ GRUBUNDA DİZ SEPTİK ARTRİTİNİN KLİNİK VE LABORATUVAR BULGULARI

Öz

Giriş: Diz septik artrit, çoğunlukla bakteriyel enfeksiyonların neden olduğu önemli bir hastalıktır. Her yaşta teşhis edilmesine rağmen, diz septik artrit genellikle yaşlılar ve küçük çocuklarda görülür. Gecikmiş tanı ve tedavi eklem tahribatına yol açabilir. Bu durum morbidite ve mortaliteyi ciddi olarak artırır. Bu çalışmanın amacı, diz septik artrit tanısı ile ameliyat edilen 65 yaş veya üstü hastaların klinik ve laboratuvar sonuçlarını sunmaktır.

Gereç ve Yöntem: Çalışmaya sadece 65 yaş veya üstü hastalar dahil edildi. Hastalar preoperatif demografik verileri, preoperatif komorbiditeleri, preoperatif ve postoperatif klinik ve laboratuvar sonuçları açısından retrospektif olarak gözden geçirildi. Ortalama postoperatif takip süresi (ay) 36.0 ± 21.6 (12–95) idi.

Bulgular: Bu çalışma retrospektif klinik çalışma olarak tasarlanmıştır. 2010–2017 yılları arasında diz septik artrit tanısı ile opere edilen 56 hasta (34 erkek, 22 kadın) çalışmaya dahil edildi. Yaş ve beden kütle indeksi ortalamaları sırasıyla 77.3 ve 27.6 idi. Eklem debridman materyalinden en az bir ajanın 43 (% 76,8) hastada izole edildiğini bulduk. En sık izole edilen bakteri *Staphylococcus aureus* (28 olgu, % 50) idi. Tüm takip süreleri arasında c-reaktif protein ve eritrosit sedimentasyon hızında istatistiksel olarak anlamlı azalma, SF-36 skor ortalamalarında ise istatistiksel olarak anlamlı artış saptandı ($p < 0.001$). Postoperatif 6. ay ile son takip arasındaki azalma hariç ($p = 0.021$) tüm visual analog skala skorları istatistiksel anlamlı olarak azaldı ($p < 0.001$).

Sonuç: Geriatrik septik artrit erken ameliyat edilmeli ve postoperatif ampirik antibiyoterapi sırasında düzenli olarak böbrek fonksiyon testleri yapılmalıdır. Geriatrik diz septik artritinin optimal yönetimi için daha fazla araştırma gereklidir.

Anahtar sözcükler: Diz; Geriatri; Septik artrit; Tedavi



INTRODUCTION

Septic arthritis (SA), an important condition included the differential diagnosis of an inflamed joint, is most frequently caused by bacterial infection (1). SA appears to be increasing due to population aging and the increased use of invasive orthopedic procedures and immunosuppressive treatments (2,3). Although SA is not age-restricted, it often develops in elderly people and young children (4), and known risk factors include diabetes mellitus; prior rheumatic disease (e.g., rheumatoid arthritis); a low socioeconomic status; and history of surgery, leg ulcers, and intraarticular injections (5).

Septic arthritis, which most commonly affects the knee in adults, is among the most urgent conditions encountered in orthopedic practice, as delayed diagnosis and treatment can lead to joint destruction and systemic complications. However, a diagnosis of SA can present challenges even for orthopedic surgeons (6,7). This is because of primarily increased joint degeneration and impairment immunity (8,9). Despite the seriousness of this condition, very few studies on the morbidity, mortality and outcomes associated with SA in adult patients have been published in the last 10 years. Therefore, this study aimed to present the clinical and laboratory findings of patients aged ≥ 65 years who were diagnosed with SA of the knee and underwent surgical treatment.

MATERIALS AND METHOD

This retrospective clinical study was conducted at The Department of Orthopedics and Traumatology of the Şişli Hamidiye Etfal Education and Research Hospital and was approved by the hospital Ethics Committee.

We identified 124 patients aged ≥ 18 years who met one of the SA diagnostic criteria proposed by Newman (9) underwent surgery for SA of the knee during 2010–2017. Our exclusion criteria were age < 65 years, diabetes-related foot infections, SA of a prosthetic joint, initial debridement in another institution and then transfer to our hospital, cognitive impairment, paresthesia of lower limbs, and a follow-up period of less than 1 year. Additionally, 5 patients

died during follow-up. At finally, 56 patients (34 male, 22 female) were included in the study. The patients were stratified into two groups: 25 underwent surgery within the first 48 hours of the onset of complaints and were designated the early operated patient group, whereas 31 underwent surgery more than 48 hours after the onset of complaints and were designated the late operated patient group.

38 and 18 patients underwent arthroscopic and arthrotomic debridements, respectively. All procedures were performed under spinal or general anesthesia. Povidone-iodine or chlorhexidine was used for sterile preparation and draping before both procedures. All arthrotomies were made anteromedially with a medial parapatellar approach. An anterolateral and an anteromedial portal was created for all arthroscopy procedures. In 4 cases, a superolateral portal was also created. After all procedures, the joint debridement material was sampled and was sent for culture. The joint was irrigated with the normal saline solution during both procedures. When the fluid returning from the joint was clear, we terminated the irrigation. Hypertrophied synovia, infected tissue, fibrinous debris, or other purulent material was debrided as necessary, openly or with an arthroscopic powered shaver. The arthrotomy or arthroscopy was closed, over a drain within the joint. The portals or arthrotomies were dressed.

Data for this study were collected from patient files and the digital databank at our hospital. We retrospectively reviewed all patients' preoperative demographic data and comorbidities, as well as preoperative and postoperative clinical and laboratory results. Serum white blood cell (WBC), c-reactive protein (CRP) and erythrocyte sedimentation rates (ESR) can be used as follow-up parameters in SA as in all infections. Quality of life for diseases related to the joint is often SF-36; subjective pain level is evaluated with visual analog scale (VAS) score (10,11). The knee Lysholm and Tegner measurements are subjective and evaluate performance and activity restrictions after surgery (12). The Kellgren-Lawrence classification commonly use as a radiologic classification of osteoarthritis (13).

The mean WBC counts, CRP levels, ESR, VAS and SF-36 scores were assessed postoperatively at 3 and 6 weeks and 6 months, as well as the last follow-up. VAS scores were determined on a scale of 0-10. The mean knee Lysholm and Tegner scores and mean Kellgren-Lawrence classification scores were also evaluated at 6 months and the last follow-up. The early operated and late operated patient groups were compared in terms of these latter three scores at 6 months postoperatively and at the last follow-up to evaluate the effects of early and late surgery on osteoarthritis progression.

SPSS 22.0 for Windows 7 (IBM, Inc., Armonk, NY, USA) was used for the statistical analysis. Categorical variables are reported as numbers and percentages, while numerical variables are reported as means, standard deviations and minimum–maximum ranges. A Friedman analysis was used to test inter-group differences in the numerical variables that were not normally distributed. Subgroup comparisons were made using a Wilcoxon analysis and interpreted using the Bonferroni correction. For normally distributed numerical variables, independent two-group comparisons were made using the Mann–Whitney U test if Student's t test did not provide a normal distribution. For all tests, statistical significance was defined as an alpha level of $p < 0.05$.

RESULTS

Of the 61 patients, 5 (8.2 %) originally intended for inclusion in our analysis died; of them, four (80 %) died within the first 6 months of SA diagnosis. The mean age of the 56 surviving patients was 77.3 ± 8.4 (range: 65–93) years, the mean body mass index (BMI; kg/m^2) was 27.6 ± 4.1 (19.8–40) and 34 patients (60.7%) were male. The right side was affected in 32 patients (57.1 %). Etiologically, 45 patients (80.4%) had hematogenous infections, 7 (12.5%) had postoperative infections and four (7.1%) had infections consequent to local injections. Additional preoperative demographic data and comorbidities are shown in Table 1. Further, 1, 4, 15, 20, and 16 patients had Charlson Comorbidity Index values of 4, 3, 2, 1 and 0, respectively.

Preoperatively, the mean WBC count was $13967.5 \pm 3911.5/\text{mm}^3$ (6500–25200), the mean CRP level was 173.4 ± 94.7 mg/l (57–452) and the mean preoperative ESR was 75.9 ± 29.1 mm/h (29–140). The mean interval between symptom onset and the surgical procedure was 4.7 ± 4.6 (1–25) days. Other preoperative laboratory and physical examination findings are shown in Table 2.

Postoperatively, patients were followed for a mean of 36.0 ± 21.6 (12–95) months. Cultures were positive from the peroperative joint debridement material in 43 patients (76.8%) and microbiological examination results are shown in Table 3. The mean length of hospital stay was 9.4 ± 6.3 (2–30) days. Cefazolin sodium or ampicillin sulbactam was administered as an intravenous empirical antibiotic and antibiotherapy was continued according to the antibiogram results. Intravenous antibiotherapy was administered for a mean of 10.1 ± 6.3 (3–30) days, while oral antibiotherapy (days) was administered for a mean of 24.6 ± 5.9 (14–36) days. An empirical antibiotic change was required in 9 patients (16.1%) due to a decrease in renal function. Further, 14 patients (25%) experienced postoperative systemic and/or joint complications, and 8 patients (14.3%) underwent reoperation because of a lack of improvement in clinical and laboratory parameters.

All postoperative decreases in WBC counts were statistically significant ($p < 0.001$) except between the 3- and 6-week follow-up visits ($p = 0.054$). All decreases in CRP and ESR levels and all SF-36 score increases between the follow-up time points were statistically significant ($p < 0.001$). All decreases in VAS scores were statistically significant ($p < 0.001$) except for the decrease between the 6-month and last follow-ups ($p = 0.021$).

The mean knee Lysholm and Tegner scores exhibited statistically significant increases between the 6-month postoperative follow-up and last follow-up ($p = 0.001$ and $p = 0.007$, respectively). Similarly, the increase in the mean Kellgren–Lawrence classification score between the 6-month and last follow-up was statistically significant ($p = 0.008$). Notably, the mean knee Lysholm and Tegner scores were significantly higher in the early operated group than in the late



operated group at both the 6-month and at last follow-up time points (both $p < 0.001$). By contrast, the mean Kellgren-Lawrence classification scores were significantly lower in the early operated group,

compared to the late operated group, at both the 6-month and last follow-up visits ($p = 0.003$ and $p = 0.002$, respectively) (Table 4).

Table 1. Demographic properties of the patients.

Variable	All patients (n=56)
Age, years	77.3±8.4 (65–93)
Male sex (n; %)	34 (60.7)
Right side (n; %)	32 (57.2)
BMI (kg/m²)	27.6±4.1 (19.8–40)
Recent trauma (n; %)	1 (1.8)
Receiving systemic steroid therapy (n; %)	11 (19.6)
Previous joint disease (n; %)	27 (48.2)
Previous knee surgery (n; %)	10 (17.9)
Previous limb surgery (n; %)	3 (5.3)
Cause of infection	
Hematogenous (n; %)	45 (80.4)
After surgery (n; %)	7 (12.5)
After a local injection (n; %)	4 (7.1)
Comorbidities	
HT (n; %)	21 (37.5)
DM (n; %)	12 (21.4)
CAD (n; %)	2 (3.6)
RA (n; %)	5 (8.9)
CKF (n; %)	9 (16.1)
Hypotiroidism (n; %)	1 (1.8)
COPD (n; %)	1 (1.8)
Asthma (n; %)	4 (7.1)
Alzheimer's disease (n; %)	2 (3.6)
GA (n; %)	2 (3.6)
FMF (n; %)	1 (1.8)
Immunosuppression (n; %)	12 (21.4)

Values are expressed as means±standard deviations (mean±SD) and minimum–maximum ranges (min–max) or as numbers of patients (n) and percentages (%).

BMI: Body mass index, HT: Hypertension, DM: Diabetes mellitus, CAD: Coronary artery disease, RA: Rheumatoid arthritis, CKF: Chronic kidney failure, COPD: Chronic obstructive pulmonary disease, GA: Gout arthritis, FMF: Familial Mediterranean fever

Table 2. Preoperative physical examination findings and laboratory results.

Variable	All patients (n=56)
Preoperative VAS score	7.2±1.0 (6–9)
Joint effusion (n; %)	46 (82.1)
Walking without support before admission (n; %)	23 (41.1)
Fever before admission (n; %)	24 (42.9)
Days with symptoms before the surgical procedure	4.7±4.6 (1–25)
WBC count (/mm ³)	13967.5±3911.5 (6500–25200)
CRP level (mg/l)	173.4±94.7 (57–452)
ESR (mm/h)	75.9±29.1 (29–140)
Preoperative synovial fluid examination	
White blood cells	111100.0±104260.4 (13600–720000)
Glucose (mg/dL)	45.9±17.3 (15–78)
Positive gram stain (n; %)	21 (37.5)
Positive synovial fluid culture (n; %)	21 (37.5)
Creatinine clearance (ml/min)	79.5±40.2 (13.6–246.6)

Values are expressed as means±standard deviations (mean±sd) and minimum–maximum ranges (min–max) or as numbers of patients (n) and percentages (%).

CRP: C-reactive protein, ESR: Erythrocyte sedimentation rate, VAS: Visual analog scale that evaluates the subjective pain on a scale of 0-10, WBC: White blood cell

Table 3. The peroperative joint debridement material microbiological examination results.

Variable	All patients (n; %)
Culture negative patients	13 (23.2)
Culture positive patients	43 (76.8)
Staphylococcus aureus	28 (50)
Staphylococcus epidermidis	4 (7.2)
Coagulase-negative Staphylococcus	3 (5.3)
Streptococcus A	3 (5.3)
Streptococcus G	2 (3.6)
Corynebacterium	2 (3.6)
Enterobacter cloacae	1 (1.8)
Total number	56 (100)

Values are expressed as as numbers of patients (n) and percentages (%).

**Table 4.** Effect of early surgery on osteoarthritis.

Variable	Early operated patients (n=25) Mean±sd	Late operated patients (n=31) Mean±sd	p
6-month follow-up Lysholm score	58.6±5.4	72.4±5.1	<0.001
6-month follow-up Tegner score	3.4±0.3	4.3±0.2	<0.001
6-month follow-up Kellgren–Lawrence classification score	3.2±1.0	2.4±0.8	0.003
Last follow-up Lysholm score	60.3±5.5	73.9±6.1	<0.001
Last follow-up Tegner score	3.5±0.4	4.4±0.3	<0.001
Last follow-up Kellgren–Lawrence classification score	3.3±0.9	2.5±0.8	0.002

The values are expressed as means±standard deviations (mean±sd).
P value<0.05 was considered to indicate statistical significance.

DISCUSSION

Advanced age is a risk factor for SA and a predictor of mortality (14). According to the literature, 40%–60% of adult patients with SA are at least 65 years of age (3,15). Similarly, 61 (49.2%) of the 124 adult patients who met our study criteria were at least 65 years of age. Previous studies have reported high morbidity and mortality rates among patients with geriatric SA, and in such cases, death usually occurs within the first 6 months (14,16). Consistent with those findings, we observed a high risk of mortality in our study population, wherein five of the 61 originally identified patients (8.2%) had died; of them, 80% had died within the first 6 months after the SA diagnosis. Additionally, several types of comorbidities have been observed in geriatric patients with SA, including osteoarthritis (OA), HT, DM, CAD, COPD, GA, stroke, CKF, hypothyroidism, asthma, liver disease, congestive heart failure, cancer, immunosuppression, and RA. In a previous mortality study, male sex, advanced age, COPD, DM, GA, congestive heart failure, stroke, kidney disease, liver disease, cancer and RA were identified as independent determinants of mortality (15). Consistent with those findings, our 56 patients had a mean age of 77.3±8.4 (65–93) years and a slight male predominance (34 men, 60.7%), and the most

common comorbidities were HT (n=21, 37.5%), immunosuppression (n=12, 21.4%) and RA (n=8, 14.3%).

A differential diagnosis of acute monoarticular arthritis should include hemarthrosis, SA, crystalline arthritis, foreign body synovitis, avascular necrosis and Lyme disease. The most obvious physical findings of knee SA include redness, regional febrility, pain, a decreased joint range of motion and swelling. A diagnosis of SA should also be considered even in the absence of symptoms of systemic infection, as findings such as a systemic fever exceeding 39°C have been reported in only 30%–40% of patients with SA (17). Similarly, only 24 patients (42.9%) in our study had a preoperative systemic high fever.

During diagnosis, preoperative VAS scores are generally not evaluated, despite that pain is one of the most important examination findings in a case of knee SA (1,4,7,17). In our study, our patients had a preoperative mean VAS score of 7.2±1.0 (6–9) and we wanted to contribute to the literature about preoperative knee pain in patients with geriatric knee SA. Furthermore, our observation of preoperative joint effusion in 82.1% of cases in our study was consistent with previously published rates

of 60%–90% (14,17). We note that our value was close to the upper limit reported in the literature and suggest that knee OA, which affects the majority of geriatric patients, increases susceptibility to joint effusion.

Similarly, the ability to walk without assistance is also infrequently evaluated in studies of knee SA. In our study, 23 patients (41.1%) were able to walk without support, suggesting that acute knee SA is also a serious problem in the geriatric population. Possibly, some patients who rely on ambulatory support may delay a visit to the hospital because the symptoms of knee SA are not obvious. Furthermore, many studies have not reported data on the interval between symptom onset and diagnosis, although one retrospective study reported an average of 11.4 days (18). By contrast, we observed a mean of 4.7 ± 4.6 (1–25) days with symptoms prior to surgery. Consistent with several studies of all-adult or only geriatric SA populations (7,17); however, the average preoperative WBC, CRP and ESR values were within normal limits in our study and our synovial examination findings were consistent with the literature (19).

In our study, at least one agent could be isolated from joint debridement material in 43 patients (76.8%), consistent with a previous report wherein the causal agent could not be isolated in only 24.2% of the patients (20). In our study, *Staphylococcus aureus* was the most common causal agent. Furthermore, we observed that the majority of patients were infected by Gram-positive bacteria, consistent with the previous series (20). Our results suggest little difference between geriatric and non-geriatric adults in terms of the causal agents of knee SA. Similarly, the mean durations of intravenous and oral antibiotic administration were consistent with the literature. However, our study observed a longer mean length of hospital stay and higher empirical antibiotic change and reoperation rates, compared to previous reports (17,20). A decrease in renal function necessitated an empirical antibiotic change in all nine affected patients (16.1%) in our

study, suggesting that renal function tests should be performed regularly in all geriatric patients receiving empirical antibiotic therapy for knee SA. Furthermore, the prolonged hospital stay increases the need to monitor patients for hospital infections and other complications.

In accordance with the literature, we observed decreases in the mean peripheral blood WBC counts beginning at the 3-week follow-up, as well as decreases in the mean CRP and ESR values to normal levels by the 6-month follow-up (3,15,21). The mean VAS score decreased significantly until the 6-month follow-up then plateaued, suggesting that the main clinical and laboratory improvements occurred in the first 6 months. Additionally, the lack of a statistically significant decrease after 6 months suggests a pre-existing knee pathology, such as OA. However, the continuous and significant increase in the mean SF-36 score throughout the follow-up period suggests that clinical healing does not correlated solely with the VAS score.

In our population, the statistically significant increases in the mean knee Lysholm, knee Tegner and Kellgren–Lawrence scores between 6 months and the last follow-up time point indicate continued clinical improvement beyond 6 months. However, OA progressed radiologically due to past SA. Notably, patients who underwent surgery within 48 hours of symptom onset had significantly higher mean Lysholm and Tegner scores and significantly lower mean Kellgren–Lawrence scores at the 6-month and last follow-ups when compared to other patients. These findings suggest that geriatric SA patients should undergo surgery as soon as possible, as this could accelerate a functional recovery and prevent the rapid development of OA.

Despite our informative findings, this study had some limitations, including a retrospective and noncomparative study design and relatively small number of patients. However, the most important strengths of this study included the single-center setting, narrow inclusion criteria (including an age



limit of ≥ 65 years) and detailed assessment of both preoperative and postoperative functional and laboratory results for all patients.

In conclusion, knee SA is associated with increased morbidity and mortality in the geriatric population, and the associated joint destruction may induce OA of the knee. Therefore, SA should not be excluded from the differential diagnosis of a geriatric patient with a swollen, inflamed knee. Accordingly, patients should be questioned carefully about preoperative comorbidities, and

a risk analysis should be performed. Geriatric patients with SA should quickly undergo surgery and postoperative short-, mid- and long-term clinical and laboratory follow-up results should be monitored carefully. Better clinical and laboratory results will require additional research such as joint drainage procedures, improved diagnosis methods, treatment duration, and antibiotic regimens into the optimal management of geriatric knee SA.

Conflict of interests

There are no conflicts of interest to declare.

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RESEARCH

OCCUPATIONAL INJURIES AMONG THE ELDERLY ADMITTED TO THE EMERGENCY DEPARTMENT

ABSTRACT

Introduction: Occupational injuries are among the leading causes of morbidity and mortality worldwide. The rate of occupational injuries in the elderly is increasing daily and is directly proportional to the increase in the elderly population. This study aimed to examine occupational injuries in elderly patients (age, >65 years) admitted to the emergency department.

Materials and Method: This cross-sectional study included 122 patients aged >65 year-old who were admitted to the third level emergency department with an occupational injury between January 2016 and January 2018. The demographic characteristics of the patients, type of work accident, type of injury, injured body parts, and comorbid conditions were recorded and statistically evaluated.

Results: The mean patient age was 67.8±2.3 years (mean±SD); 85.5% (n:108) of the patients were men, and 85.2% (n:104) were retired. Hypertension was the most commonly observed comorbidity (35.2%, n:43). Falls from the same or a high level were the most commonly observed injury mechanisms (56.7%, n:74). The extremities were the most commonly injured body part (54.9%, n:67); sprains/strains were the most commonly observed injury type (47.5%, n:58). None of the injuries resulted in death.

Conclusion: The proportion of elderly workers is increasing owing to the rising elderly population worldwide. Because of increased cognitive and motor disabilities, there is an increased risk of occupational injuries in this age group. Thus, occupational injuries in the elderly should be more carefully evaluated in the emergency department.

Keywords: Aged; Emergency medicine; Occupational injury

ARAŞTIRMA

ACİL SERVİSE BAŞVURAN YAŞLI HASTALAR ARASINDA İŞ KAZALARI

Öz

Giriş: İş kazaları dünya çapında morbidite ve mortalitenin önde gelen nedenleri arasındadır. Yaşlı popülasyonda görülen iş kazaları yaşlı nüfusun artışına paralel olarak gün geçtikçe artmaktadır. Bu çalışmada acil servise başvuran 65 yaş üstü iş kazalarının incelenmesi amaçlanmıştır.

Gereç ve Yöntem: Kesitsel tipte planlanan bu çalışmaya Ocak 2016-Ocak 2018 tarihleri arasında üçüncü seviye acil servise başvuran 65 yaş üstü iş kazası vakaları dahil edilmiştir. Toplam 122 hastanın demografik özellikleri, iş kazası türü, yaralanma şekilleri, yaralanan vücut bölgeleri ve komorbid durumları kayıt altına alınıp istatistiksel değerlendirmeye tabi tutuldu.

Bulgular: Hastaların ortalama yaşı 67.8±2.3 (ort.±ss), %85'i (n=108) erkek ve %85.2'si (n=104) emekli idi. En sık komorbid hastalık hipertansiyon (%35.2, n:43), en sık yaralanma mekanizması ise aynı seviyeden ya da yüksekten düşme (%56.7, n=74) idi. Hastalarda en sık ekstremitelere yaralanması (%54.9, n=67) tespit edilirken, en sık yaralanma türü ise burkulma/gerilme tarzı (%47.5, n=58) yaralanmalar idi. Hiçbir vaka mortal seyretmedi.

Sonuç: Dünya'da yaşlı nüfus oranındaki artışa paralel olarak yaşlı çalışan nüfus oranı da artmaktadır. Yaşlılığın doğası gereği kognitif ve motor fonksiyonlarda yaşanan gerilemeler bu yaş grubunda iş kazası görülme ihtimalini daha da artırmaktadır. Yaşlı iş kazası hastalarının acil servis başvurularında çok daha dikkatli değerlendirme yapılmalıdır.

Anahtar sözcükler: Yaşlı; Acil tıp; İş kazası

INTRODUCTION

Occupational injuries are globally significant owing to the associated high mortality and morbidity as well as the loss of labor force and economy. Approximately 100 million cases of occupational injuries are annually reported worldwide (1). Although the risk of occupational injuries is determined by many factors, The employee's age is one of the most influential factors determining the risk of occupational injuries. Cognitive functions and motor skills decrease with age, resulting in an increased risk of occupational injuries (2,3). Pransky et al. (4) reported that workers aged >55 years suffered more serious occupational injuries than those aged <55 years. Furthermore, smoking, alcohol abuse, and regular medications also impact the risk of developing occupational injuries.

The proportion of actively working elderly individuals is increasing in concert with the increased life expectancy. The Organization for Economic Cooperation and Development (OECD) reported that by 2025, 33% of the male population and 38% of the females population working in Europe will be ≥ 60 years of age (5). According to the Turkish Statistical Institute data, there were approximately 5,891,694 elderly individuals (age, ≥ 65 years) in 2013, which has increased by 17% over the past five years to reach a population of approximately 6,895,385 in 2017 (6). During this period, the elderly population comprised 7.7% of the total population in 2013, which increased to 8.5% in 2017. Men comprised 44% of the elderly population. According to population projections, the elderly population is predicted to comprise 10.2% of the total population in 2023, 12.9% in 2030, 16.3% in 2040, 22.6% in 2060, in 2080 (6).

Although we lack sufficient data on our country, it is well known that the proportion of actively working elderly individuals has increased over the years. Economic difficulties are the primary reason why the elderly population continues to work even after retirement; further, because of insufficient pension salaries many elderly individuals continue to work even post retirement (7). Continuing to work at an old age causes some potential problems (8).

The musculoskeletal labor force capacity reportedly decreases by 25% between 30 and 65 years of age (9,10). Hence, the risk of occupational injuries naturally increases if individuals continue to do the same work over 65 years of age. This increased risk has been reported for both machine-mounted jobs and for drivers aged >65 years (8,11). Moreover, an increased risk of accidents has been reported for the elderly working in industries and as truck drivers. Age-related declines in motor skills and increased vision-related problems further increase the risk of accidents in the elderly (11). A study reported that workers aged 30–65 years had a 25% reduction in musculoskeletal capacity, which reduced more rapidly after 65 years of age (9). Considering all these factors, the increased proportion of the elderly population and workers makes occupational injuries worth investigating in this age group.

MATERIALS AND METHOD

Ethical committee approval was obtained prior to study initiation. This study retrospectively analyzed elderly patients (age, >65 years) with occupational injuries who were admitted to the third level emergency department between January 2016 and January 2018. The hospital information registry system and emergency service records were scanned, and cases of occupational accidents in patients aged >65 years were detected. The scan detected total 128 cases; six cases were excluded because their patient records were not completely accessible. Data, such as age, sex, educational status, workplace, comorbidities, retirement status, accident type, and injury severity, were recorded in the study form. The data were analyzed using SPSS (Statistical Package for Social Sciences) version 22 (license number: 10240642). Here, descriptive statistics have been presented as numbers and percentages for qualitative data, and median, minimum, and maximum values have been presented for quantitative data. The Shapiro–Wilk test was used to assess the normality of the quantitative variables. The Mann–Whitney *U*-test was used to compare two independent groups,



and the Kruskal–Wallis test was used to compare three independent groups when the data were not normally distributed. Pearson’s Chi-square test was used to compare groups with two subjects, and Fischer’s exact test was used when the minimum expected value was <5. Pearson’s Chi-square test was used to compare 3 groups, and Fischer’s exact test was used as the final test when the smallest expected value was >20%.

If there were significant differences in three or more group comparisons, the group or groups that differed were identified using the Bonferroni’s Multiple Comparison test. Spearman’s correlation test was used to determine the relationship levels

of the quantitative data that were not normally distributed. $p < 0.05$ was considered statistically significant.

RESULTS

Total 108 (85.5%) patients were men. The mean patient age was 67.8 ± 2.3 (min–max, 65–77) years. Evaluation of the patients in terms of educational status revealed that 14 (11.5%) were illiterate, 78 (64%) were primary school graduates, 27 (22.1%) were high school graduates, and 5 (3.4%) were university graduates. The demographic characteristics of the patients are presented in Table 1.

Table 1. Demographic characteristics of the patients.

Characteristic	Mean±SD (Min–max)	p
Age	67.8±2.3 (65–77)	
Gender	n (%)	
Men	108 (85.5)	<0.01
Women	14 (14.5)	
Marital status		
Single	11 (9)	
Married	111 (91)	<0.01
Education level		
Illiterate	14 (11.5)	
Primary school	78 (64)	0.02
High school	27 (22.1)	
University	5 (3.4)	
Admission type to Emergency Department		
Self-admission	58 (47.5)	0.16
Private vehicles	37 (30.3)	
By ambulance	27 (22.2)	
Retirement status		
Retired	104 (85.2)	<0.01
Not retired	18 (14.8)	
Occupational classification		
Farmer	54 (44.3)	0.24
Manual worker	18 (14.8)	
Artisan	37 (30.2)	
Truck driver	13 (10.7)	

Only 24 (19.7%) patients were found to have no comorbidities, and 67 (54.9%) had two or more comorbidities. Hypertension (n=43, 35.2%) was the most common comorbidity, followed by diabetes mellitus (n=27, 22.1%), and these were also the most common comorbidities present simultaneously (n=22, 18%). The most common injury mechanism was falls (n=74, 60.7%), followed by contact with a machine (n=27, 22.1%). Regarding the injury mechanism, a statistically significant difference was observed in falling injuries ($p=0.015$) compared with the oth-

er injury types. The most commonly injured body part was the extremities (n=67, 54.9%; $p=0.017$), followed by the head (n=35, 28.7%), thorax (n=14, 11.4%), and abdomen (n=6, 5%). The most common injury type was a sprain/strain (n=53, 43.4%), followed by fractures (n=27, 22.1%). Sprain/strain type injuries occurred significantly more frequently than other injury types ($p=0.019$). The comorbidities, injury mechanisms, injured body regions, and injury types are presented in Table 2.

Table 2. Comorbidities, injury mechanisms, injured body regions, and injury types observed in the patients.

Comorbidities	n (%)	p
None	24 (19.7)	0.28
Hypertension	43 (35.2)	
Diabetes mellitus	27 (22.1)	
Respiratory disease	21 (17.2)	
Urinary disease	17 (13.9)	
Musculoskeletal disorder	15 (12.3)	
Gastrointestinal disease	12 (9.8)	
Malignancy	7 (5.7)	
Injury mechanism		
Falls	74 (60.7)	<0.01
Contact with a machine	27 (22.1)	
Chemical exposure	14 (11.5)	
Kicked by animal	7 (5.7)	
Injured body part		
Extremity	67 (54.9)	0.02
Head	35 (28.7)	
Thorax	14 (11.4)	
Abdomen	6 (5)	
Type of injury		
Sprain/strain	58 (47.5)	0.03
Fracture	27 (22.1)	
Laceration	27 (22.2)	
Lung injury	9 (7.4)	
Visceral injury	7 (5.7)	
Major head trauma	3 (2.5)	



Although there were no fatal injuries, blunt thorax and abdominal trauma were detected in 16 (13.1%) patients, and major head trauma and traumatic subarachnoid hemorrhage were detected in three (2.5%) patients. Total 103 (84.4%) patients were discharged from the emergency department after follow-up and treatment, and 19 (15.6%) were hospitalized in different services and discharged

after receiving follow-up treatment. Most of these patients were transferred to the orthopedics department owing to their extremity traumas, which were statistically more frequent compared to the other departments ($p:0.019$). The departments and number of patients hospitalized in those are presented in Table 3.

Table 3. The departments and the number of patients hospitalized in them.

Department	n (%)	p
Orthopedics	11 (57.8)	<0.01
Neurosurgery	3 (15.7)	
Plastic surgery	2 (10.5)	
General surgery	2 (10.5)	
Thoracic surgery	1 (5.5)	

In the study period, 758 occupational injury cases between the ages of 18-65 year-old were admitted to the emergency department. Of these, 524 (69.1%) were male and 234 (30.9%) were female. The mean age of the patients was 42.8 ± 14.7 (mean \pm SD). The most common type of injury in this group was buckling-strain injuries (n: 256, 33.7%), and the second was the falling from same or high level (n:115, 15.1%). These were followed by machine-related injuries (n:82, 10.8%), motor vehicle accidents (n:55, 7.2%) and other minor injuries. Twelve (1.5%) of these patients died in the emergency department. Four (33.3%) of the patients died due to fall from high level, 5 (41.7%) were due to motor vehicle accidents and 3 (25%) were due to agricultural machinery accidents.

DISCUSSION

This study aimed to analyze the occupational injuries in individuals aged >65 years. In the United States, workers aged >65 years old comprise 14% of the

total workforce (8); however, we lack clear data for this rate in our country. Moreover, the United States Bureau of Labor Statistics has stated that the number of workers aged >55 years has increased by 49.9% in the last decade, whereas the number of workers aged 25–54 years has increased by only 5.5%. These data show that the proportion of elderly workers in the total population will significantly increase in the near future. Likewise, the number of cases of elderly occupational injuries is also predicted to increase.

Male patients accounted for a very large proportion (85.5% n=108) of the included patients. In a study (12) it was stated that; male workers comprised 63% of the total workers aged >65 year-old, and this ratio was stated as 80% by Turkish Statistical Institution.

We believe that the rate stated by the Turkish Statistical Institution is more accurate because most of the working individuals in our country are men. We think these rates may change if the participation rate of females in the total workforce increases in

the coming years. Algarni et al. (13) reported that the rate of the elderly workers living alone was 7%; this rate was 9% in our study. Both rates are quite low when compared with the general population. We believe this rate is low because elderly individuals do not prefer living alone owing to health-related concerns, etc., and the increasing need for support as they age. Berecki et al. (14) reported that elderly workers have higher levels of education. However, in our study, only 5.4% of the patients were graduates. This low rate may be attributed to most individuals working in agricultural sectors, which has low education requirements. Additionally, in another study (15) it was reported that; elderly workers with higher education levels remained in the labor force for longer durations. We currently lack sufficient data on this subject in our country; however, in our study, the opposite was observed. This differing result may be attributed to the restricted types of jobs available in our country.

People continue to work even after retirement owing to several reasons, the most important being economic difficulties. An interesting finding of the current study was that 85.5% of the patients continued to actively work despite having retired. The rate of continuing to work after retirement was reportedly 8.6% in the Netherlands, and 30.8% in the United States (16). Both studies (14,15) examined the reasons behind individuals continuing to work after retirement and reported the following: 1) they love to work, 2) they think it provides a meaning to their lives, and 3) economic difficulties. However, in our country, financial reasons played the major role in elderly individuals continuing to work.

Algarni et al. (13) reported that 50% of the individuals aged >65 years who were admitted with occupational injuries worked in the transport sector. In our study, we observed that most elderly individuals admitted to the emergency department were farmers (44.3%). We think the rate of injured farmers was so high because the economy of our region mostly depends on agriculture, and a larger proportion of the population works in this sector. A

Swedish study (17) reported that the mortality rate due to occupational injuries for elderly farmers was 7%. No deaths owing to occupational injuries were reported in our study. We believe that because of the socio-cultural structure of our country, work that heavily lifting should be performed by young workers and not elderly workers. Additionally, 10.7% of the elderly individuals in our study were truck drivers. Although this proportion is low compared with other studies (8,13), it shows that prohibition of truck driving after 66 years of age is effective in this result. We suspect that this rate would further increase if the age limit is increased, because our region is located at the border, thus providing more opportunities for truck drivers. Yenil et al. (18) reported that 34.2% of the elderly patients were admitted to the emergency department through an ambulance; this rate was 22.2% in our study. We think this low rate is related to the low injury severity in these cases. Moreover, trauma-type injuries are perceived as much more urgent by society, and the patients do not always wait for an ambulance.

The most common injury mechanism was falls (60.7%). Of the 61 patients injured by falling from the same level, 13 fell from a truck, and all the falls occurred either from the top of the truck or when climbing into the truck. Rogers et al. (19) reported that falls were responsible for 33% of all occupational injuries in the elderly. We think the high rate in our study is related to the comorbidities in the elderly workers; the structure of the working surface was also influential because most individuals worked in the fields. Algarni et al. (13) reported that 62% of the occupational injuries occurred in the extremities; our study reported a similar rate (54.9%). We believe this is because extremities can be easily injured during falls and when working with machines. Steege et al. (19) reported that fractures were the most common injury type in the elderly (62.5%); In contrast, this rate was 22.1% in our study. We think this difference occurred because the elderly population in our country may be working in less risky jobs in terms of accidents and in jobs with less heavy lifting. The



most frequent injury type observed in our study was strain/sprain injuries (47.5%). These injuries were primarily the result of falling from the same level. Increased rates of musculoskeletal disorders also contributed to this high rate.

When the occupational injuries under the age of 65 years and elderly were compared to each other, it was seen that, occupational injuries under the age of 65 were significantly higher ($p=0.024$). We think that; the much higher ratio of the workers under 65 years of age could be responsible from this result. However, no statistically significant difference was found between these two groups in terms of injury types ($p=0.674$).

Another important point here is that; no mortal injury was seen in the group over 65 years, while 12 (1.5%) people lost their lives in the group under 65 years of age. We think that; working in heavier and more risky jobs of the young population compared to the elderly population is responsible for this result. Pransky et al. (4) reported that occupational injuries were much more severe in older workers than in younger ones. Furthermore, other studies in the literature have reported that the mortality rate due to occupational injuries was higher in older workers than in younger ones. We think that occupational injuries in the elderly are mostly related to truck accidents and that the high mortality rate due to this type of trauma contributes to the overall high mortality rate.

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Our study has some limitations. This study was conducted at only one center. Additionally, there could have been some bias in patient selection because we only included patients who declared their occupational injury at their first application. However, some elderly patients could have had declared their injuries as domestic accidents instead of occupational accidents to refrain from legal procedures. Finally, the rates of informal working in the elderly population could not be clearly determined.

In conclusion, the life expectancy is increasing in our country as well as worldwide. Additionally, the proportion of the elderly population in the total workforce will increase in the coming years for many reasons. Further, the risk of occupational injuries is increasing in concert with the decrease in cognitive and physical abilities in the elderly population. Thus, occupational injuries in the elderly should be more carefully evaluated in the emergency department, and their comorbidities must be considered when providing treatment. We believe this study will be a guide for future studies evaluating occupational accidents in the elderly in our country.

Conflicts of interest

None.

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RESEARCH

THE GERIATRIC MISTREATMENT SCALE: THE VALIDITY AND RELIABILITY OF ITS TURKISH ADAPTATION

ABSTRACT

Introduction: This study aims to assess the validity and reliability of the Turkish version of the 'Geriatric Mistreatment Scale', which was developed to identify elder abuse.

Materials and Method: Random sampling methods were used to survey 776 elders over the age of 60 residing in various cities in Turkey in their own homes or with other family members (their children or relatives). The Geriatric Mistreatment Scale is a 22-item assessment designed to assess five categories of elder abuse; namely, physical abuse, psychological or emotional abuse, neglect, financial or material abuse and sexual abuse. To adapt the scale into Turkish, language validity and confirmatory factor analysis were performed to assess its validity and internal consistency, and item analyses to assess its reliability.

Results: Among the 776 participants, 460 (59.3%) were female and 316 (40.7%) were male. The mean age of the participants was 71.68 years. For 22 items of the scale, a Cronbach's alpha coefficient of 0.80 was obtained, and item-total score correlations ranged from 0.27 to 0.58.

Conclusion: The Turkish adaptation of the Geriatric Mistreatment Scale is a valid and reliable measurement tool that can be used in Turkish populations to determine rates of the five categories of elder abuse.

Keywords: Elder abuse; Aged; Reproducibility of results; Turkey

ARAŞTIRMA

GERIATRİK İSTİSMAR ÖLÇEĞİ: TÜRKÇE'YE UYARLAMA, GEÇERLİLİK VE GÜVENİLİRLİK ÇALIŞMASI

Öz

Giriş: Bu çalışmada yaşlı istismarını belirlemek üzere geliştirilen "Geriatrik İstismar Ölçeği"nin Türkçe formunun geçerlilik ve güvenilirlik çalışmasının yapılması amaçlanmaktadır.

Gereç ve Yöntem: Araştırmanın çalışma grubunu kolay ve tesadüfi örnekleme metotları kullanılarak ulaşılan, Türkiye'nin farklı illerinde ikamet eden, kendi evinde ya da yakınlarının (çocukları veya akrabalarının) evinde yaşayan 60 yaş üstü 776 yaşlı oluşturmaktadır. Geriatrik İstismar Ölçeği; fiziksel istismar, duygusal istismar, ihmal, ekonomik istismar ve cinsel istismar olmak üzere yaşlıya yönelik kötü muamelenin beş farklı türünü ölçmek üzere tasarlanmış ve 22 maddeden oluşan bir ölçektir. Ölçeğin Türkçe'ye uyarlanmasında, geçerlik için dil geçerliliği ve doğrulayıcı faktör analizi yapılırken; güvenilirlik içinse iç tutarlılık ve madde analizlerinden yararlanılmıştır.

Bulgular: Araştırmaya katılan 776 yaşlının 460'ı kadın (%59.3), 316'sı erkek (%40.7); yaş ortalaması 71.68'dir. Ölçeğin 22 maddesi üzerinde yapılan test sonucunda Cronbach Alpha değerinin 0.80, madde-toplam puan korelasyonlarının 0.27 ile 0.58 arasında değiştiği bulunmuştur.

Sonuç: Geriatrik İstismar Ölçeği beş farklı türde yaşlı istismarının belirlenmesi amacıyla Türk örnekleminde kullanılacak geçerli ve güvenilir bir ölçme aracıdır.

Anahtar sözcükler: Yaşlı istismarı; Yaşlı; Uyarlama; Türkiye

INTRODUCTION

Elder abuse can be defined as a single or repeated act or lack of appropriate action occurring within any relationship where there is an expectation of trust, which causes harm or distress to an older person. It can take various forms such as physical, psychological, sexual and financial, and it can also be the result of intentional or unintentional neglect (1). Elder mistreatment is a phenomenon that has increased proportionally with the increase in the number of older adults in various populations around the world and is particularly more significant in developed countries. Elder abuse has been a major issue since the 1950s in the USA and the 1970s in Britain, but the legal and social aspects of this issue were not addressed until the 1980s and 1990s (2), when the US enacted the 'Older Americans Act' (OAA) to prevent elder abuse, established the 'Adult Protection Services' (APS) agency and created the 'Elder Abuse Forensic Center' that adopted a multidisciplinary approach to identifying elder abuse (3).

Elder abuse in Turkey has recently received increasing attention as a common problem due to the country's increasing elderly population. There have been several studies endeavouring to identify elder abuse, but these have been very limited (4,5).

Most victims do not report elder abuse, as they feel guilty, ashamed or fearful; instead, they tend to pursue an isolated life. Therefore, it is very hard to identify elder abuse (6). Additionally, most social service professionals lack sufficient information and cannot differentiate the symptoms of elder abuse from other physical or mental disorders, making it difficult to recognise elder abuse (7). Therefore, it is important to increase awareness on elder abuse all over the world.

There have been many studies on the identification and evaluation of elder abuse. Various assessment tools have also been developed to identify elder abuse. Some of these assessment tools identify elder abuse *in general* (8); some of

them identify particular *sub-categories* of elder abuse (9); and some determine *risk factors* for elder abuse (10). In Turkish literature, there is only one Turkish assessment tool to identify elder abuse. Özmete adapted the Hwalek-Sengstock Elder Abuse Screening Test into Turkish, which is a three-factor measurement tool defining elder abuse as overt violation of personal rights or direct abuse (11).

The literature suggests that further scientific research is required to assess elder abuse (12). In addition, it is clear that research on *all categories* of elder abuse is important to provide a safer life for the ageing population, as research findings can ensure that social service professionals will have the information that they need to help the elderly (13).

Turkey is an ageing country. This has brought protective services and measures for the elderly into government and social agendas. The present situation of elder abuse and how abuse typically occurs should initially be defined. Currently, however, there is no Turkish assessment tool to identify the specific types of elder abuse and perpetrators. Therefore, this study aims to adapt the 'Geriatric Mistreatment Scale' into Turkish. It is considered that this assessment tool will increase elder abuse awareness, which will lead to an increase in precautions and social services provided to elderly people to improve their quality of life.

MATERIALS AND METHOD

Study design: This study was conducted using a methodological research design for the adaptation of the Geriatric Mistreatment Scale to Turkish.

Geriatric Mistreatment Scale

The Geriatric Mistreatment Scale was developed in 2013 by Giraldo-Rodriguez and Rosas-Carrasco (*Development and psychometric properties of the Geriatric Mistreatment Scale*) to assess elder mistreatment (9). The Geriatric Mistreatment Scale is a 22-item assessment designed to assess five



different categories of elder abuse: (a) physical abuse, (b) psychological or emotional abuse, (c) neglect, (d) financial or material abuse and (e) sexual abuse. The answer to each item is either 'yes' or 'no', and 'yes' for a question equals one point (0=No=No abuse, 1=Yes=Abuse). Each question aims to identify whether there was any mistreatment in the last 12 months, and a 'yes' answer to at least one question means that the individual was abused. The scale can be scored either by summing the scores for all 22 items (determining the presence or absence of elder abuse in general) or by calculating the scores independently for each sub-category of mistreatment.

The Geriatric Mistreatment Scale is unique as it assesses different categories and frequencies of elder abuse and asks who is responsible for the abuse (the spouse, son, daughter, daughter-in-law, etc. of the elderly victim), when the abuse started and the sex of the perpetrator.

Study group: The study group consisted of 776 elders over the age of 60 who resided in various cities in Turkey in their own homes or with family members (their children or other relatives). Almost 35 measures were done for each item in this 22-item scale. Among the 776 participants, 460 (59.3%) were female and 316 (40.7) were male; the mean age of participants was 71.68 years.

Data collection: Only elderly individuals who were capable of providing their own health information were interviewed and included in this study. For instance, patients diagnosed with advanced dementia or Alzheimer's were excluded from the research. The data collection interviews were conducted in the houses of the elderly in a comfortable atmosphere at a convenient time. Data was collected through face-to-face interviews.

Analyses: We used AMOS program for confirmatory factor analysis and SPSS program for other statistics. Kendal W analysis has been used for language validity; internal consistency analysis has been used for reliability; test-retest reliability has

been evaluated by split half reliability; confirmatory factor analysis has been used for validity and descriptive statistics (mean and standard deviation) of the scale has been given. For analyzing the relationship between sociodemographic variables and elder abuse independent sample t-test and F test were used.

RESULTS

Validation of the Turkish Version of the Scale

Permission: The scale, originally written in Spanish, was also published in English ('*Development and psychometric properties of the Geriatric Mistreatment Scale*', *Geriatrics Gerontology International*, 2013). The authors' permission was asked and received via email to adapt the Geriatric Mistreatment Scale into Turkish. To conduct the study, permission was granted from the Non-Initiative Clinical Research Ethical Committee of the Graduate School of Health Sciences of Selcuk University.

Language validity: The scale was translated from English to Turkish and then revised by six experts who are fluent in both languages. Experts were asked to evaluate each item in terms of four possible responses: not applicable, partially applicable, applicable, or completely applicable. Consistency among the experts' responses was evaluated using the Kendal W analysis (KW:17.236, p:0.384), and it was determined that the experts were consistent with each other. These experts' suggestions were taken into account to identify necessary corrections. Some additions and extractions were done to complete these corrections. The final version of the Turkish scale was sent to language experts to re-translate it into English, and the matching was performed. Thus the scale was thoroughly and accurately translated into Turkish, resulting in a scale that can be easily applied.

Reliability Study

The reliability of the Geriatric Mistreatment Scale

was evaluated using internal consistency analysis. Cronbach's alpha coefficient was determined. The Cronbach alpha was 0.80 as a result of the test being conducted on 22 items of the scale. As for the five sub-dimensions of the scale, the alpha value was 0.724 for physical abuse, 0.719 for psychological abuse, 0.344 for neglect, 0.616 for financial abuse and 0.628 for sexual abuse (Table 1).

Item analysis of the scale indicated that item-total score correlations range between 0.27 and 0.58, and it was determined that the removal of any item did not increase Cronbach's alpha value in a significant way (Table 2).

Test-retest reliability was evaluated by split half reliability. Cronbach alpha was found 0.75, Spearman-Brown was found 0,86 and Guttman Split-Half Coefficient was found 0,86.

Validity Study

A confirmatory factor analysis was conducted to evaluate the validity of the factor structure of the scale (14). It was determined that the first model did not have acceptable fit indices; therefore, regression weights were analysed to re-structure a new model whose values, excluding the CFI value, were defined to show acceptable fit indices (Table 3).

To check whether a model is acceptable, first the chi-square index is divided by the degrees of freedom; the criterion for acceptance is a result less than or equal to 2. The model is acceptable if its value is less than or equal to 5.

The RMSEA value showed significance at less than 0.080, indicating that the model fits well. The SRMR value was less than 0.10, the CFI value was 0.85, and the AGFI value was 0.89, which indicates that the model's goodness-of-fit indexes are satisfactory and that the model fits the data. The GFI value, which was greater than or equal to 0.91, also indicated that the model fits the data. (Figure 1)

When the dispersion of the subscales Geriatric Mistreatment Scale according to various socio-demographic characteristics is explored, the psychological abuse score of women and illiterate have higher than men and other groups of educational level. Financial/Economic abuse score of elderly people living with child or others has higher than elderly people living own house ($p < 0.05$). It has been observed that the score of abuse does not change according to other factors ($p > 0.05$) (Table 4) and descriptive statistics (mean and standard deviation) of the scale has been given (Table 5).

Table 1. Cronbach's alpha values for Geriatric Mistreatment Scale.

Scale	Cronbach's alpha values
Physical	0.724
Psychological	0.719
Neglect	0.344
Financial/Economic	0.616
Sexual	0.628
Total	0.805

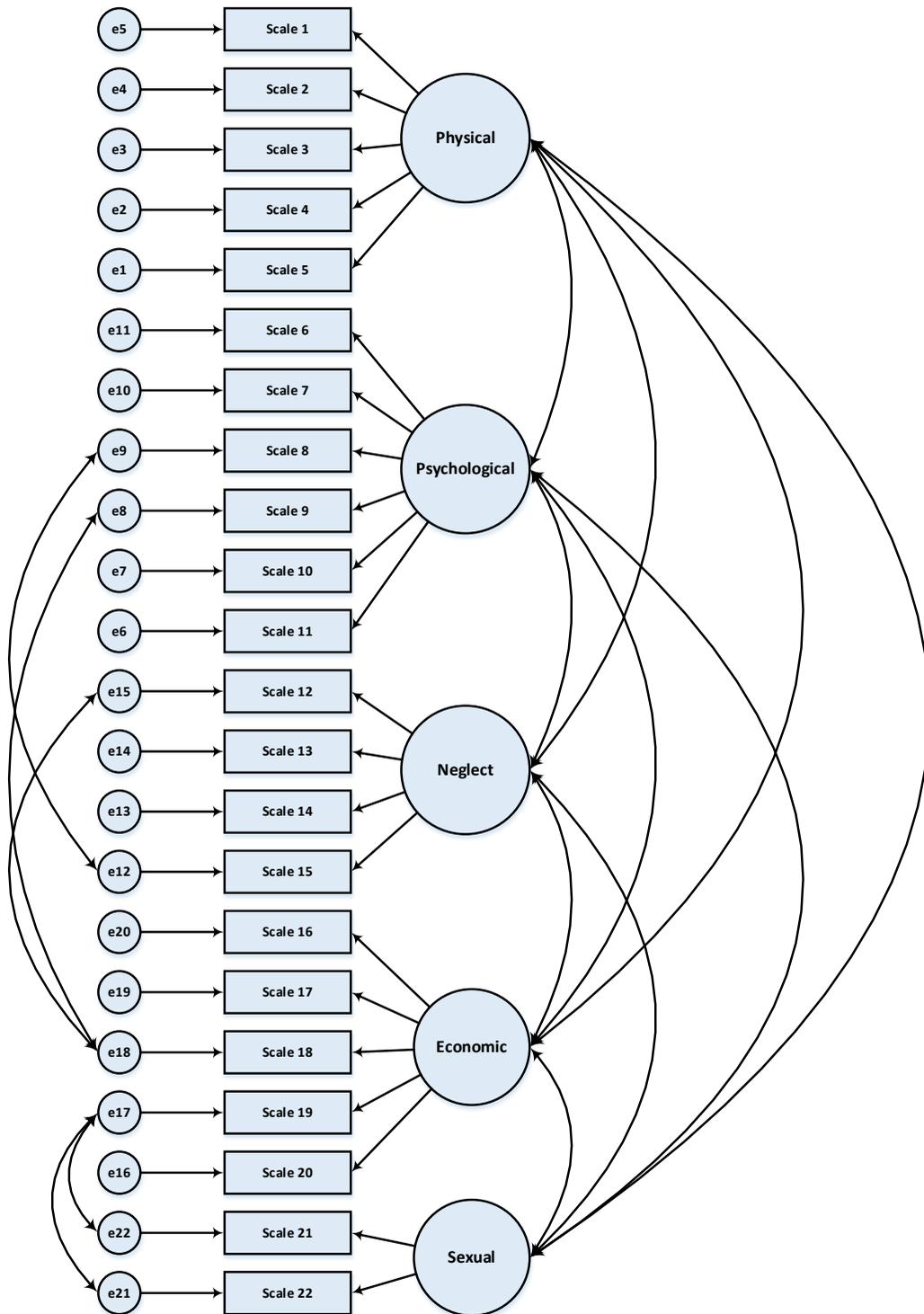


Figure 1. Confirmatory Factor Analysis.

Table 2. Geriatric Mistreatment Scale and Item-Correlation Analysis.

In the last year...	Corrected Total Item Correlation (n=776)	Alpha value if item were deleted
1. Have you been hit?	0.409	0.795
2. Have you been punched or kicked?	0.383	0.797
3. Have you been shoved, or have you had your hair pulled?	0.454	0.793
4. Have you had an object thrown at you?	0.333	0.799
5. Have you been assaulted with a knife or blade?	0.278	0.807
6. Have you been humiliated or made fun of?	0.572	0.783
7. Have you been treated with indifference or ignored?	0.584	0.783
8. Have you been isolated or kicked out of the house?	0.350	0.798
9. Has anyone made you feel afraid?	0.367	0.797
10. Have your decisions not been respected?	0.526	0.790
11. Have you been forbidden to go out or be visited?	0.379	0.798
12. Has anyone kept you from getting clothes, footwear, etc.?	0.338	0.799
13. Has anyone kept you from receiving the medications you need?	0.272	0.808
14. Have you been denied protection when you need it?	0.335	0.800
15. Have you been denied access to the house where you live?	0.287	0.802
16. Has anyone managed or is anyone managing your money without your consent?	0.400	0.795
17. Has your money been taken from you?	0.405	0.795
18. Has anyone taken any of your belongings without your permission?	0.361	0.798
19. Have any of your properties been sold without your consent?	0.299	0.801
20. Have you been pressured so that you no longer own your house or any other property?	0.331	0.799
21. Have you been forced to have sex even if you did not want to?	0.303	0.801
22. Has anyone touched your genitals without your consent?	0.278	0.805

Table 3. Consistency index results for Geriatric Mistreatment Scale.

Consistency Index	First Model	Second Model	Ranges for Consistency
χ^2/sd	5.856	3.778	$2 < \chi^2/sd \leq 5$
GFI	0.880	0.920	$0.90 \leq GFI$
AGFI	0.847	0.895	$0.85 \leq AGFI \leq 0.90$
CFI	0.752	0.863	$0.95 \leq CFI < 0.97$
SRMR	0.080	0.060	$0.05 \leq SRMR \leq 0.10$
RMSEA	0.079	0.061	$0.05 < RMSEA \leq 0.08$



Table 4. Dispersion of the Geriatric Mistreatment Scale according to various socio-demographic characteristics.

Characteristics	Physical mean±sd	Psychological mean±sd	Neglect mean±sd	Financial mean±sd	Sexual mean±sd
Gender					
Female	0.20±.68	0.94±1.3	0.10±0.35	0.31±0.80	0.04±0.26
Male	0.15±0.57	0.64±1.16	0.07±0.31	0.29±0.66	0.03±0.19
T test	1.114	3.186	1.088	0.516	0.689
p value	0.266	0.001	0.277	0.606	0.491
Marital Status					
Single	0.13±.53	0.93±1.37	0.10±0.38	0.34±0.85	0.03±0.25
Married	0.21±0.70	0.75±1.19	0.07±0.30	0.28±0.67	0.03±0.22
T Test	-1.611	1.921	1.342	1.203	0.114
p value	.108	0.055	0.180	0.229	0.909
Education					
Illiterate	0.21±0.72	1.01±1.36	0.08±0.32	0.33±0.84	0.22±0.01
Literate	0.14±0.45	0.89±1.25	0.08±0.30	0.22±0.59	0.27±0.02
Primary School and above	0.17±0.6	0.67±1.19	0.08±0.36	0.32±0.74	0.22±0.01"
F test	0.611	5.701	0.004	1.134	0.416
P value	0.543	0.003	0.996	0.322	0.660
Living Area					
Own house	0.19±0.67	0.78±1.24	0.08±0.33	0.27±0.68	0.04±0.24
With child or others	0.12±0.42	1.00±1.38	0.08±0.35	0.48±1.00	0.02±0.19
T Test	1.041	-1.771	0.033	-2.932	0.761
p value	0.298	0.077	0.974	0.003	0.447

Table 5. Descriptive statistics of the scale and subscales.

	N	Minimum	Maximum	Mean	sd
Physical	776	.00	4.0	0.18	0.64
Psychological	776	.00	6.0	0.82	1.27
Neglect	776	.00	3.0	0.09	0.34
Financial	776	.00	5.0	0.31	0.75
Sexual	776	.00	2.0	0.04	0.23
Total	776	.00	13.0	1.4	2.31

DISCUSSION

This study aims to adapt the Geriatric Mistreatment Scale developed by Giraldo-Rodriguez and Rosas-Carrasco into Turkish and to conduct validity and reliability studies of the Turkish version (9). In the validity study of the scale, language validity and structure validity methods were used. Validity refers to how well a test measures what it is purported to measure. The validity of a scale can be examined under the headings of content, logical, referential and structural validity (15). The methods to be used are determined according to the objective and features of the scale. For instance, an explanatory factor analysis with content and structural validity is an option preferred for the recently designed scales. Scales that have been adapted to another language, however, must be analysed for their psycholinguistic characteristics (language validity), and confirmatory factor analysis is accordingly preferred. The language of the present scale was shown to have a comprehensible structure through the language validity assessment in this study. Following that, the Turkish form was re-translated into English to ensure that the two English versions had the same meaning. All concepts were transferred to the Turkish form to be measured in a similar way. Confirmatory factor analysis (CFA) is a commonly used method to investigate construct validity (16). The ratio of chi-square to its degrees of freedom (Cmin/sd), Goodness of Fit Index-GFI, Adjusted Goodness of Fit Index-AGFI, Comparative Fit Index-CFI, Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation-RMSEA were analysed for the CFA of this study. In addition to these indices, other assessments can be done for a CFA. In the literature, many different indices are used to conduct CFA (17,18). A meta-analysis study has pointed out the importance of the use of the SRMR and RMSEA indices (19). Schreiber et.al. defined the break points and acceptable values for fit indices (17). Similarly,

Bayram identified goodness-of-fit and acceptable values (16) (See Table 2). According to these, all values excluding the CFI value fit well in this study. CFI compares the fit of a target model to the fit of a null or independent model, that is, a model in which the variables are assumed to be uncorrelated. Values that approach 1 indicate an acceptable fit. In this study, the CFI value was not far from the expected value but was not exactly the expected value. Ayyıldız and Cengiz have pointed out that even a value of 0.85 would be sufficient for a CFI value in a new developing area (20). Our finding may be due to the lack of literature on measurements for abuse and neglect. Our language validity and CFA results suggest that the Turkish version of the Geriatric Mistreatment Scale is a valid assessment tool to identify elder abuse and each of its sub-categories in Turkish culture. However, its validity should be confirmed in a multi-centre study. As additional scales are developed in the future, the validity of each scale should be repeated with reference to this study.

Reliability is an indicator of the persistence of the results obtained from different measurements under the same conditions (21). Cronbach's alpha value for the total scale is 0.80, while the values for the five sub-dimensions are 0.724 for physical abuse, 0.719 for psychological abuse, 0.344 for neglect, 0.616 for financial abuse and 0.628 for sexual abuse. Cronbach's alpha coefficient of the original form of the scale was determined to be 0.82, and alpha values for the sub-dimensions ranged between 0.55 and 0.87. A high value for Cronbach's alpha indicates good internal consistency of the items in the scale. George and Mallery proposed that a Cronbach's alpha coefficient of 0.80 is good, 0.70 is acceptable and 0.60 is questionable (22). Özdamar alternatively proposed that Cronbach's alpha values ranging between 0.00 and 0.40 show that the data are not reliable, values between 0.41 and 0.60 represent low reliability, values between 0.61 and 0.80 represent significant reliability and



values ranging between 0.81 and 1.0 represent high reliability (23). Based on these definitions, it can be concluded that our scale has a significant reliability coefficient. Reliability is lower for each of the sub-dimensions of the scale, a finding that may be due to the low number of abuse and neglect cases in our sample.

The positive and high item-total score correlation for our scale indicates that each item is effective and adequate to measure the intended behaviour. The acceptable coefficient for item selection should be higher than 0.20 and 0.25 (24). In this study, it was found that the item-total score correlations ranged between 0.27 and 0.58, and it was noted that Cronbach's alpha did not increase significantly with the removal of any one item.

After the adaptation of the Geriatric Mistreatment Scale to Turkish, the relationship between the elderly and the sociodemographic characteristics of the elderly was evaluated. Similar to our research in the literature, it is stated that female elders are more emotionally abused than males (25).

To conclude, the Geriatric Mistreatment Scale is uniquely useful as it assesses five different categories of elder abuse: physical abuse, psychological or emotional abuse, neglect, financial or material abuse and sexual abuse. It is an assessment tool that can be used by healthcare, social science and forensics professionals and academicians to identify the categories of elder abuse and perpetrators.

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RESEARCH

PHYSICIANS' ATTITUDES TOWARDS THE ELDERLY: AGEISM IN A UNIVERSITY HOSPITAL IN TURKEY

ABSTRACT

Introduction: The aim of this study was to determine attitudes of research assistant physicians towards the elderly in a university hospital and to evaluate the association of sociodemographic and occupational characteristics with ageism.

Materials and Methods: In this descriptive study, the target population comprised 521 research assistant physicians who worked at the internal medicine and surgical clinics of the university hospital between December 2014 and March 2015. Variables considered in this study included demographic and occupational characteristics and attitudes towards the elderly. The Ageism Attitude Scale (AAS) was used to identify the physicians' attitudes towards the elderly. The data were collected using the sealed envelope system. Results are presented as percentage distribution and mean. A t-test was used for statistical analysis.

Results: A total of 327 physicians were included in this study. The total mean score obtained from the EDAS was 86.9±8.0, with a score of 37.4±3.8 for the Restricting the Life of the Elderly dimension, 30.2±4.3 for the Positive Ageism dimension and 19.3±3.1 for the Negative Ageism dimension. No significant difference was observed between the mean attitude scores in terms of sociodemographic and occupational characteristics (p>0.05)

Conclusion: This study showed demonstrated that, in general, research assistant physicians exhibited a positive attitude towards the elderly.

Keywords: Aged; Attitude; Ageism

ARAŞTIRMA

HEKİMLERDE YAŞLILARA İLİŞKİN TUTUMLAR: TÜRKİYE'DE BİR ÜNİVERSİTE HASTANESİNDE YAŞ AYRIMCILIĞI

Öz

Giriş: Bir üniversite hastanesinde araştırma görevlisi olarak çalışan hekimlerin yaşlılara yönelik tutumlarını ve tutumlarının bazı sosyodemografik ve mesleki değişkenlere göre farklı olup olmadığını belirlemek amaçlandı.

Gereç ve Yöntem: Tanımlayıcı tipteki araştırmada İzmir'de bir üniversite hastanesinde Aralık 2014- Mart 2015 tarihleri arasında Dahili ve Cerrahi bilimlerde araştırma görevlisi olarak çalışan 521 hekime ulaşmak hedeflendi. Çalışmanın değişkenleri yaş ayrımcılığına ilişkin tutumun yanı sıra demografik ve mesleki özelliklerdi. Yaş ayrımcılığını belirlemek için Yaşlı Ayrımcılığı Tutum Ölçeği (YATÖ) kullanıldı. Veri kapalı zarf yöntemi ile toplandı, ortalama, yüzde dağılımları ile sunuldu t testi ile analiz edildi.

Bulgular: Çalışmada 327 hekimin verisi sunuldu. YATÖ'den alınan ortalama puanlar; toplamda 86.9±8.0, yaşlının yaşamının sınırlanmasında 37.4±3.8, pozitif ayrımcılıkta 30.2±4.3, negatif ayrımcılıkta 19.3±3.1'di. Demografik ve mesleki özelliklere göre YATÖ ortalama puanları arasında anlamlı fark bulunmadı (p>0.05).

Sonuç: Bir üniversite hastanesinde çalışan araştırma görevlisi hekimlerinin genelde, yaşlılara karşı olumlu tutum sergiledikleri belirlenmiştir.

Anahtar sözcükler: Yaşlı; Tutum; Yaş ayrımcılığı

INTRODUCTION

The proportion of elderly individuals in the general population is gradually rising worldwide, including in Turkey. The population aged ≥ 65 years in Turkey has increased by 17% in the last five years, and the elderly accounted for 8.3% of the entire population in 2016 (1). Such an increase in the proportion of elderly individuals corresponds with an increased need for healthcare and social support for the elderly. Ageism is defined as prejudice and discrimination based on a person's chronological age (2). Ageism increases needs for healthcare and social support for the elderly (3,4) and diminishes access to and the quality of healthcare among elderly individuals (5-8). Conversely, as a result of their disease burden, elderly individuals encounter healthcare workers more frequently than young individuals, emphasizing the importance of the perceptions of healthcare personnel towards the elderly. Additionally, due to increasing elderly populations, physicians are required to provide healthcare services to an increasing number of elderly individuals each day. Healthcare problems among the elderly are more complex than those in young individuals. Additionally, negative attitudes of healthcare personnel may increase the complexity of health problems among the elderly (9).

Furthermore, the healthcare staff members, who are part of a system that favours early discharge, find it difficult to manage patients who experience longer disease duration and require more time to recuperate and rehabilitate. This characteristic of the healthcare system increases the impact of ageism (10).

Ageism studies have typically been conducted among students (7,8,11,12). Moreover, studies regarding the attitudes of healthcare workers regarding ageism, particularly physicians, are scarce. Taken together, the abovementioned problems indicate the importance of determining

the perceptions and attitudes of physicians towards the elderly.

Thus, the objectives of this study were to determine the perceptions and attitudes related to ageism of research assistant physicians working at the internal medicine and surgical clinics of the university hospital between December 2014 and March 2015 and to evaluate the association between sociodemographic and occupational characteristics and ageism.

MATERIALS AND METHOD

Sample

This descriptive study included 521 physicians working as research assistants at the internal medicine and surgical clinics of the university hospital between December 2014 and March 2015. All research assistant physicians during this time were included in this study without sampling.

Variables

Variables considered in this study included demographic and occupational characteristics and attitudes towards the elderly. The Ageism Attitude Scale (AAS) was used to identify the physicians' attitudes towards the elderly. The AAS is a 5-point Likert-type scale developed by Vefikuluçay, which comprises 25 items whose validity and reliability are confirmed by the choices 'Strongly Disagree', 'Disagree', 'Undecided', 'Agree' and 'Strongly Agree'. The Cronbach alfa reliability coefficient of this scale has been reported to be 0.80. This scale includes both positive and negative attitude statements. Positive attitude statements are scored as follows: 5=Strongly Agree, 4=Agree, 3=Undecided, 2=Disagree and 1=Strongly Disagree. Negative attitude statements are scored in the opposite manner as that described above. The maximum and minimum obtainable points in the scale are '115' and '23', respectively.



Positive attitude related to elder discrimination increases as the points in the scale increase. The scale comprises three dimensions as follows:

1. Restricting the Life of the Elderly: These are beliefs and perceptions of the society that are related to restricting the social lives of the elderly. The maximum and minimum obtainable scores in this dimension are '45' and '9', respectively.

2. Positive Ageism towards the Elderly: These are positive beliefs and perceptions of the society towards the elderly. The maximum and minimum obtainable scores in this dimension are '40' and '8', respectively.

3. Negative Ageism towards the Elderly: These are negative beliefs and perceptions of the society towards the elderly. The maximum and minimum obtainable scores in this dimension are '30' and '6', respectively (13).

Data collection and analysis

The questionnaires were distributed to the research assistant physicians and were collected by the sealed envelope system. Complementary results are presented as the percentage distribution and mean and standard deviation. The association between sociodemographic and occupational characteristics and ageism was analysed by t-test.

Ethical issues

This study was approved by Non-Invasive Research Ethics Committee of the university (2014/38-07).

RESULTS

A total of 327 physicians were included in this study (response rate, 62.8%); 170 (54.7%) of the participants were female, and the mean age of the participants was 30.4 ± 3.0 (range, 26–49) years. The mean total work experience was 6.2 ± 2.9

(range, 2–25) years, and the mean working time in a department was 24.4 ± 16.6 (range, 1–96) months. The sociodemographic characteristics are presented in Table 1.

A total of 47.4% ($n=155$) of the physicians had lived with an elderly individual during any period of their lives. Moreover, 75.5% ($n=246$) of the physicians stated that their family structure influenced their attitude towards the elderly, and 95.7% ($n=313$) of the physicians stated that departments that provide medical care for the elderly are necessary.

The total mean score obtained from the AAS was 86.9 ± 8.0 (range, 62–112), with a mean score of 37.4 ± 3.8 (range, 27–45) for the Restricting the Life of the Elderly dimension, 30.2 ± 4.3 (range, 14–40) for the Positive Ageism dimension and 19.3 ± 3.1 (range, 11–28) for the Negative Ageism dimension.

The lowest mean score in the Restricting the Life of the Elderly dimension of the AAS ($n=3.7 \pm 0.9$) was observed in the item 'Elderly people can't carry bags and packages without help' (Table 2). The lowest mean score in the Positive Ageism dimension of the AAS was observed in the items 'the elderly are more likely to be patient than young people' (3.0 ± 1.1), 'the elderly are more tolerant than young people' (3.2 ± 0.9) and 'the elderly are more compassionate' (3.7 ± 0.8) (Table 3). The lowest mean score in the Negative Ageism dimension of the AAS was observed in the items 'preference should be given to young people over the elderly' (2.8 ± 1.0) and 'the elderly are not able to adapt to changes as young people do' (2.8 ± 1.0). Generally, the Negative Ageism dimension was the dimension with the lowest mean scores (Table 3).

No significant difference was observed between the mean attitude scores in terms of sociodemographic and occupational characteristics ($p > 0.005$) (Table 4).

Table 1. Sociodemographic characteristics of the study population.

Characteristics	n (%)
Age group (years; n=327)	
20–29	145 (44.3)
30–39	179 (54.7)
>40	3 (0.9)
Marital status (n=327)	
Married	134 (41.0)
Single	184 (56.3)
Widowed or divorced	9 (2.8)
Family type (n=326)	
Nuclear family	298 (91.4)
Extended family	28 (8.6)
Place where participant resided the longest (n=327)	
Rural area	24 (7.3)
Urban area	303 (92.7)
Department (clinic) where employed (n=327)	
Internal Medicine	257 (78.6)
Surgery	70 (21.4)
Total work experience (years; n=327)	
1–9	291 (89.0)
>10	36 (11.0)
Working time in a department (months; n=326)	
0–11	80 (24.5)
12–23	82 (25.2)
24–35	63 (19.3)
>36	101 (31.0)
Work-related satisfaction (n=327)	
Satisfied	263 (80.4)
Dissatisfied	64 (19.6)

**Table 2.** Descriptive statistics for the 'Restricting the Life of the Elderly' dimension.

Restricting the Life of the Elderly	Strongly Disagree n (%)	Disagree n (%)	Undecided n (%)	Agree n (%)	Strongly Agree n (%)	mean±sd
Lives of the elderly should be limited to their homes	196 (59.9)	115 (35.2)	11 (3.4)	2 (0.6)	3 (0.9)	4.5±0.7
The external appearance of the elderly is repulsive	158 (48.3)	128 (39.1)	18 (5.5)	9 (2.8)	14 (4.3)	4.2±1.0
It is unnecessary for the elderly to buy homes, cars, possessions or clothes	137 (41.9)	157 (48.0)	22 (6.7)	11 (3.4)	0 (0.0)	4.3±0.7
Elderly people who lose their spouses should not remarry	119 (36.4)	134 (41.0)	61 (18.7)	12 (3.7)	1 (0.3)	4.1±0.8
The elderly should live in homes for the elderly	101 (30.9)	133 (40.7)	77 (23.5)	14 (4.3)	2 (0.6)	4.0±0.9
Preference should be given to the care of young people over that of the elderly in a hospital setting	115 (35.2)	166 (50.8)	29 (8.9)	14 (4.3)	3 (0.9)	4.2±0.8
Elderly people should be paid less than young people in the work force	134 (41.0)	155 (47.4)	28 (8.6)	6 (1.8)	4 (1.2)	4.3±0.8
Elderly people cannot carry bags and packages without help	41 (12.5)	172 (52.6)	83 (25.4)	28 (8.6)	3 (0.9)	3.7±0.8
The care of the elderly should not be considered an economic burden by family members	10 (3.1)	7 (2.1)	18 (5.5)	153 (46.8)	139 (42.5)	4.2±0.9

Table 3. Descriptive statistics of the 'Positive Ageism' and 'Negative Ageism' dimension.

Dimension	Strongly Disagree n (%)	Disagree n (%)	Undecided n (%)	Agree n (%)	Strongly Agree n (%)	mean±sd
Positive Ageism						
Elderly people are more patient than young people	24 (7.3)	95 (29.1)	84 (25.7)	103 (31.5)	21 (6.4)	3.0±1.1
Preference should be given to the elderly in places where waiting in line is required	9 (2.8)	8 (2.4)	25 (7.6)	130 (39.8)	155 (47.4)	4.3±0.9
Young people should learn from the experiences of elderly people	5 (1.5)	10 (3.1)	47 (14.4)	163 (49.8)	102 (31.2)	4.1±0.9
The elderly should be shown importance by the family members with whom they live	7 (2.1)	4 (1.2)	5 (1.5)	148 (45.3)	163 (49.8)	4.4±0.8
The elderly are more compassionate	3 (0.9)	14 (4.3)	104 (31.8)	153 (46.8)	53 (16.2)	3.7±0.8
When decisions are made in the family, the opinions of the elderly should be considered	6 (1.8)	10 (3.1)	72 (22.0)	192 (58.7)	47 (14.4)	3.8±0.8
The elderly are more tolerant than young people	10 (3.1)	63 (19.3)	136 (41.6)	99 (30.3)	19 (5.8)	3.2±0.9
When the family budget is being developed, the opinions of the elderly should be sought	4 (1.2)	24 (7.3)	56 (17.1)	208 (63.6)	35 (10.7)	3.8±0.8
Negative Ageism						
Elderly people are always ill	14 (4.3)	151 (46.2)	66 (20.2)	85 (26.0)	11 (3.4)	3.2±1.0
The basic responsibility of the elderly should be to help their children with tasks, such as housework, kitchen chores and the care of their grandchildren	59 (18.0)	185 (56.6)	48 (14.7)	31 (9.5)	4 (1.2)	3.8±0.9
Preference should be given to young people over the elderly when they are hired for jobs	21 (6.4)	52 (15.9)	116 (35.5)	113 (34.6)	25 (7.6)	2.8±1.0
Elderly people are not able to adapt to changes like young people	20 (6.0)	55 (16.6)	96 (29.4)	143 (43.7)	15 (4.6)	2.8±1.0
Preference should be given to young people for promotions in work situations	17 (5.2)	89 (27.2)	105 (32.1)	95 (29.1)	21 (6.4)	3.0±1.0
Elderly people should not go outside on their own	55 (16.8)	176 (53.8)	61 (18.7)	32 (9.8)	3 (0.9)	3.8±0.9



Table 4. Univariate comparison of scores according to participant characteristics.

Characteristics	Restricting Life		Positive Ageism		Negative Ageism		Total AAS score	
	mean±sd	p ^a	mean±sd	p ^a	mean±sd	p ^a	mean±sd	p ^a
Age group(years)	20–29 (n=145)	37.4±3.8	30.3±3.9	0.579	19.3±3.0	0.977	87.0±8.2	0.831
	>30 (n=181)	37.5±3.8	30.1±4.5		19.3±3.2		86.8±8.0	
Sex	Female (n=170)	37.8±3.5	30.0±4.1	0.220	19.3±3.2	0.798	87.2±7.8	0.780
	Male (n=141)	37.0±3.9	30.6±4.4		19.3±3.1		86.9±8.0	
Marital status	Married (n=134)	37.5±3.8	30.5±4.5	0.222	19.3±3.7	0.844	87.3±8.5	0.411
	Not married (n=193)	37.4±3.8	30.0±4.1		19.2±3.0		86.6±7.6	
Family type	Nuclear family (n=298)	37.5±3.7	30.1±4.2	0.220	19.2±3.1	0.286	86.8±7.8	0.546
	Extended family (n=28)	36.8±4.5	31.1±4.8		19.9±3.5		87.8±10.2	
Place where the participant resided the longest	Rural (n=24)	36.7±3.8	31.8±4.2	0.056	19.1±3.2	0.792	87.6±8.4	0.645
	Urban (n=303)	37.5±3.7	30.1±4.3		19.3±3.1		86.9±8.0	
Department (clinic) where employed	Internal Medicine (n=257)	37.4±3.8	30.2±4.4	0.709	19.4±3.1	0.364	87.0±8.2	0.568
	Surgery Medicine (n=70)	37.4±3.9	30.0±3.8		19.0±3.1		86.4±7.3	
Work-related satisfaction	Satisfied (n=263)	37.5±3.8	30.1±4.1	0.714	19.4±3.2	0.298	87.1±7.8	0.459
	Dissatisfied (n=64)	37.0±3.5	30.4±4.8		18.9±3.0		86.2±8.7	
Work experience (years)	1–9 (n=291)	37.4±3.7	30.2±4.2	0.849	19.3±3.2	0.721	86.9±8.0	0.954
	>10 (n=36)	37.8±4.0	30.2±4.9		19.1±3.0		87.0±8.3	
Working time in the department (months)	0–23 (n=162)	37.4±3.7	30.3±4.3	0.675	19.2±3.3	0.758	86.9±8.2	0.897
	>24 (n=164)	37.4±3.8	30.1±4.2		19.4±3.0		86.8±7.8	
Living with the elderly	Yes (n=155)	37.7±4.0	30.3±4.4	0.649	19.3±3.1	0.931	87.3±8.2	0.417
	No (n=172)	37.2±3.6	30.1±4.2		19.3±3.2		86.5±7.8	

^at-test

DISCUSSION

In this study, the attitudes on ageism of the research assistant physicians who worked at the internal medicine and surgical clinics of the university hospital were determined. Our findings revealed that, in general, physicians expressed a positive attitude regarding the elderly (mean score on AAS, 86.9). Additionally, the mean scores were 37.4 for the 'Restricting the Life of the Elderly' dimension, 30.2 in the Positive Ageism dimension and 19.3 in the Negative Ageism dimension. The study did not set a cut-off score, a value above which would have indicated a negative attitude, while a value below which would have indicated a positive attitude. However, two studies performed in a group of physicians in Turkey have reported similar scores (range, 83.1–86.6) (14,15), while only one study has revealed a lower score (68.4) (16). This score was assessed as a 'positive attitude' by the investigators who performed the study. The mean scores obtained in those studies using the same scale were as follows: 80.0 among nurses (14), 84.0–87.0 among students at a nursing school (17,18), 83.7 among the students of the Faculty of Economics and Administrative Sciences (19) and 70.6 among the students of the Vocational School of Health Services (20). The score obtained in a study that was performed in the general population was 80.2 (21). Generally, such high mean scores are obtained due to certain aspects of Turkish culture, such as traditional and unchanging expectations of respect and obedience towards the elderly and the protection of the elderly. Additionally, in our study, three out of every four physicians believed that family structure would influence their attitude towards the elderly, which demonstrates the importance of cultural influence. However, the social status of the elderly in Turkish culture varies, particularly in metropolitan areas. The reasons for this variation could be explained by increases in urbanisation, migration and industrialisation, economic difficulties, women's participation in the

workforce, changes in individuals' social lives and changes in family structures (22). Nevertheless, this variation should be taken into consideration.

Other studies that used different scales have shown that attitudes towards the elderly and older patients range from neutral to positive among physicians (23-25). Some studies have also provided the evidence of the existence of ageism (26,27).

In this study, although the total mean score was high, negative attitudes were also discovered when the scores for individual items were assessed. The lowest mean score in the Restricting the Life of the Elderly dimension of the AAS was observed in the item 'Elderly people cannot carry bags and packages without help', indicating that the elderly are considered to be weak or helpless. The lowest mean score in the Positive Ageism dimension of the AAS was observed in the items 'the elderly are more patient than young people', 'the elderly are more tolerant than young people' and 'the elderly are more compassionate'. The highest scores for the Positive Ageism dimension were observed in the items 'Priority should be given to the elderly in places where waiting in line is required' and 'The elderly should be shown importance by the family members with whom they live'. This positive attitude is driven by the society's expectation of respect for the elderly, which is embedded in their culture. Nonetheless, negative attitudes towards the individual characteristics of the elderly can also be observed.

In the present study, compared with other dimensions, the mean scores of the items in the Negative Ageism dimension were the lowest. The Negative Ageism dimension revealed that physicians who are research assistants believed that young people should be given priority over the elderly for recruitment and promotions. This attitude may be due to high levels of unemployment and the competitive nature of professional life.



In this study, no significant difference was observed between the mean attitude scores of physicians according to age group, sex, marital status, family type, the location where the physician has lived the longest, department (clinic) where employed, work-related satisfaction, work experience, working time in the department or whether they had lived with the elderly. No significant association was found between ageism and sex in the study conducted by Kearney et al. (27), and no significant associations of ageism were found with sex, marital status, birth place and family structure in the study conducted by Ögenler et al. (15). Similarly, no significant associations of ageism were observed with sex, marital status, family structure and working hours in the study performed by Ünalán et al. (16) as well as with age, marital status, living arrangement and years of practice since graduation in the study conducted by Lui (24). Finally, no significant associations of ageism were reported with age, sex and years of practice in the study performed by Polat et al. (14). In contrast, the study performed by Leung et al. has revealed that physicians' characteristics that are associated with more positive attitudes towards the elderly included age of ≥ 30 years, female sex and postgraduate years of ≥ 10 (23). In the study performed by Ünalán et al., participants who had previously lived with an elderly family member exhibited a positive attitude towards elderly people (16). All of these studies were performed in a population of physicians and other healthcare workers. However, these different results may be due to differences between the scales used as well as cultural differences. The study performed by Elbi et al. is an important study as it demonstrates how the scale used can affect the results obtained. In their study, the association between sex and attitude revealed different results using different scales (28).

This study has some limitations. This study was performed only on physicians in a university hospital setting in a specific region of Turkey. In addition,

since the sample size was small, the generalizability of the findings is limited. The overall response rate was moderate. Low participation could have been due to the lack of interest in the subject matter and lack of free time. Individuals who have participated in the study may have an interest in geriatrics and may already have a more positive attitude towards the elderly. Additionally, in studies in which an attitude is determined, the social desirability response bias should also be considered. Further, how different attitudes are reflected in behaviour remains unknown. Nevertheless, this study is important since it is one of the rare studies performed on resident physicians at a university hospital. Previous studies performed in Turkey and in other countries were typically performed on students.

In conclusion, physicians generally demonstrate positive attitudes towards the elderly. Nonetheless, when the individual items of the scale are reviewed, some negative attitudes may be observed. The physicians' attitudes towards the elderly are not related to their sociodemographic characteristics or working conditions. Although positive attitudes towards the elderly are considered to be influenced by cultural structure, it should be considered that the cultural structure changes over time. The establishment of theoretical and practical training that will encourage positive attitudes towards the elderly is imperative in medical education. For instance, contact with healthy elderly individuals during the early stages of education may lead to an improvement in attitude (23). Furthermore, considering the elderly patients who require healthcare services, the development of the concept of 'elder-friendly' would prevent negative attitudes or at least reduce their effects. Thus, studies that investigate these types of interventions on the attitudes of physicians towards the elderly are warranted.

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CASE REPORT

A RARE CASE OF MAXILLARY HEPATOCELLULAR CARCINOMA METASTASIS MIMICKING PYOGENIC GRANULOMA IN A GERIATRIC PATIENT

ABSTRACT

Metastasis to the oral region is an uncommon characteristic of hepatocellular carcinoma. As such, diagnosis of these malignancies can be challenging due to clinical similarities with benign lesions. This report describes a 70-year-old woman with a rare case of oral metastasis of hepatocellular carcinoma that manifested in the anterior maxilla. The diagnosis of hepatitis B- and C-related hepatocellular carcinoma was made one year before presentation to the authors' clinic. At the time of admission, the patient was undergoing medication with Sorafenib. An erythematous, haemorrhagic, painless lesion exhibited rapid growth in the maxilla over a two-month period. Based on clinical characteristics, the lesion was considered a pyogenic granuloma before pathological examination. After surgical intervention, the healing process in the eight-month follow-up period was uneventful, with no evidence of recurrence. This report highlights the importance of meticulous clinical and pathological evaluations in patients with suspected oral metastatic lesions that may mimic benign conditions.

Keywords: Carcinoma, Hepatocellular; Neoplasm Metastasis; Oral Manifestations; Pathology, oral

OLGU SUNUMU

GERİATRİ YAŞ GRUBUNDAKİ BİR HASTADA HEPATOSELLÜLER KARSİNOMUN NADİR RASTLANAN VE PYOJENİK GRANÜLOMAYI TAKLİT EDEN MAKSİLLER METASTAZI: OLGU SUNUMU

Öz

Oral bölgeye metastaz hepatosellüler karsinomun nadir bir özelliğidir. Benign lezyonlara klinik benzerlikleri nedeniyle bu malign lezyonların teşhisi zor olabilir. Bu vaka raporunda, hepatosellüler karsinomun nadir görülen anterior maksilla metastazı saptanan 70 yaşında kadın hasta anlatılmıştır. Hepatit B ve C'ye bağlı hepatosellüler karsinom teşhisi, hasta kliniğimize gelmeden bir yıl önce konulmuştur. Başvuru esnasında, hasta Sorafenib tedavisi altındadır. Maksillada görülen eritematöz, hemorajik, ağrısız lezyon iki aylık süreç içerisinde hızlı büyüme göstermiştir. Lezyon patolojik inceleme öncesinde klinik özelliklere dayanılarak piyojenik granüloma ön tanısıyla değerlendirilmiştir. Cerrahi müdahale sonrasında, iyileşme periyodu sekiz aylık takip boyunca sorunsuz olmuştur ve rekürrensi gösterecek herhangi bir durum saptanmamıştır. Bu raporda, benign durumları taklit eden oral metastatik lezyonlardan şüphelenilen hastalarda titiz klinik ve patolojik değerlendirmelerin önemi vurgulanmaktadır.

Anahtar sözcükler: Hepatosellüler karsinom; Metastaz; Oral belirtiler; Oral patoloji



INTRODUCTION

Metastatic tumours of the oral region are uncommon and account for only 1-4% of all oral malignancies (1). Oral metastases can occur in the jaw bones and, more rarely, in the oral soft tissues. These malignancies are likely to exhibit non-specific symptoms and may clinically mimic benign lesions, thus posing a diagnostic challenge to practitioners (2). The lungs, kidney, breast, and bone comprise the majority of primary sites that metastasize to the oral cavity (3). Hepatocellular carcinoma (HCC) is the most common liver malignancy and rarely exhibits metastatic lesions in the oral tissues. In 1957, the first case of HCC metastasis to the oral region was reported by Dick et al. (4); since then, approximately 50 cases have been documented in the literature (5). In the present report, we describe a case of HCC metastasis to the gingiva, clinically mimicking a pyogenic granuloma.

CASE

A 70-year-old woman previously diagnosed with HCC was referred to the authors' hospital in April 2018 with a two-month history of bleeding gingival mass adjacent to the left upper canine. Detailed medical history revealed that the HCC diagnosis was made one year before presentation to the clinic, and the patient was currently under medication with Sorafenib for the management of hepatitis B- and C-related HCC. At the time of admission, the patient had been using partial dentures and exhibited a nodular mass with no symptoms except for bleeding. Additionally, it was noted that the lesion exhibited rapid growth over a two-month period. On clinical examination, an erythematous, haemorrhagic and painless mass, measuring 2.0×1.5 cm, was detected in the maxillary anterior gingiva adjoining the upper left canine (Figure 1)



Figure 1. Clinical appearance of the erythematous and haemorrhagic mass in the maxillary anterior gingiva adjoining the upper left canine.

On palpation, the lesion was firm in consistency, with mild tenderness. Panoramic radiography revealed widening of the periodontal ligament space around

the left maxillary canine, with no remarkable alterations in the structure of the bone (Fig. 2).

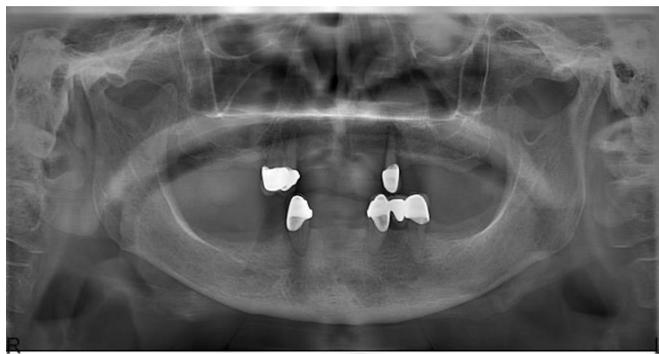


Figure 2. Panoramic radiograph revealing widening of the periodontal ligament space around the left maxillary canine and no remarkable alterations in the structure of the bone.

Based on preoperative clinical features of the lesion, it was considered to be a pyogenic granuloma. Excisional biopsy and mobile tooth extraction were performed. No alveolar bone destruction was observed intraoperatively; nevertheless, aggressive curettage was performed to prevent the possibility of recurrence. The surgery was completed with primary closure of the mucosal flap without any complications, and the specimen was sent for pathological examination.

Microscopically, excisional biopsy (Protocol Number: B-11941-18) revealed a highly vascular and cellular neoplasm, with characteristic trabecular and pseudoglandular architecture localized beneath the ulcerated mucosal epithelium (Fig. 3A). Neoplastic cells, with 22 mitoses per 10 high-power fields, exhibited abundant eosinophilic cytoplasm with prominent nucleoli. Immunohistochemically, the neoplastic cells were positive for CAM 5.2 and Hep Par-1, which supports the diagnosis of metastatic HCC (Fig. 3B).

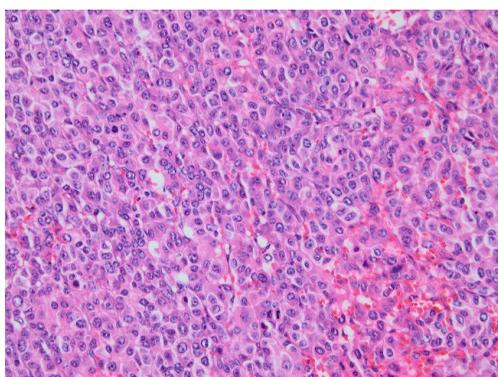


Figure 3A.

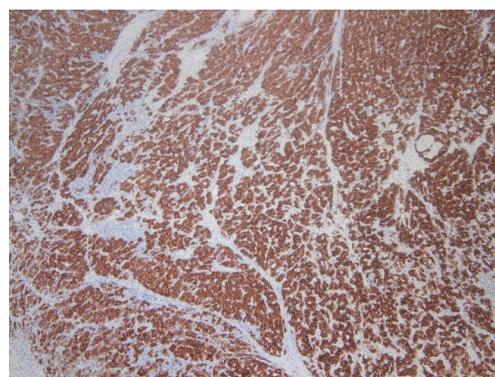


Figure 3B.

Figure 3. A. Excisional biopsy: Epithelioid cells with high nuclear/cytoplasmic ratio, and with trabecular and pseudoglandular architecture (hematoxylin and eosin stain, original magnification $\times 200$). **B:** Immunohistochemically, the neoplastic cells are positive for Hep Par-1, supporting the diagnosis of metastatic hepatocellular carcinoma (Hep par-1 stain, original magnification $\times 40$).

Metastatic melanoma was excluded by negative immunostaining for HMB-45, S100, and Melan A.



The healing process during the eight-month follow-up period was uneventful and the patient

demonstrated no evidence of recurrence (Fig. 4).



Figure 4. Postoperative appearance after a 3-month follow up period.

The oncologist was informed and, furthermore, lung metastasis was detected. It was decided, however, that the patient will continue with the current medical treatment protocol.

DISCUSSION

Distant metastasis to the oral region is a rare phenomenon, comprising only 1% of all oral malignancies (2). These metastatic neoplasms can extend to the jaw bones or, more rarely, occur in the oral soft tissues. The clinical diagnosis of oral metastasis is a challenge for oral surgeons; therefore, these lesions are usually misdiagnosed as pyogenic granuloma, hyperplastic gingival inflammation, peripheral giant cell granuloma, or other benign tumours (6). Another significant consideration is that approximately 25% of oral metastases account for the first sign of an undiscovered malignancy at a distant site (7). Therefore, routine histopathological evaluation is crucial for proper management in oral lesions.

HCC, which occurs mainly in male patients, is the most common liver cancer, and is usually associated with alcoholism, and hepatitis B and C infections (1). Metastasis from an HCC to the

oral region is uncommon and the mechanisms of dissemination are not fully understood. However, the current understanding is that metastatic spread to the jaws from an HCC is considered to be mainly via the hematogenous route with accompanying lung metastasis (8) and, the mandible is the most frequently affected site in the maxillofacial region (1). Regarding sex and region of invasion, the present case is an extremely uncommon presentation of HCC metastasis.

In most cases, clinical findings of metastatic oral neoplasms imitate reactive or hyperplastic lesions; moreover, radiographic features of these lesions are usually not pathognomonic (5). Similarly, the lesion in this case had erythematous and haemorrhagic characteristics and, furthermore, exhibited rapid growth in a short period of time. It had a lobular surface, with no evidence of a malignant condition in the panoramic radiograph. Moreover, the presence of some etiologic factors,

such as poor oral hygiene and incompatible dentures, increased the tendency to diagnose this as a pyogenic granuloma clinically.

Palliative care is required to improve the quality of life and provide pain relief in the presence of extrahepatic metastatic HCC, which is associated with poor long-term prognosis (9). Sorafenib, an inhibitor of tyrosine protein kinase, was approved for treatment of advanced HCC. Nevertheless, its therapeutic effect in HCC patients with extrahepatic metastasis remains unclear. A previous study reported that Sorafenib could be a long-term treatment option for patients with advanced HCC,

regardless of extrahepatic metastasis (10). From a different perspective, due to the occurrence of maxillary metastasis under Sorafenib treatment in the present case, alternative drug options-rather than this medicament for advanced HCC-may be a target of future investigations.

In conclusion, maxillary metastases of HCC are rare and may mimic benign lesions; hence, awareness and meticulous clinical and histopathological examinations play an important role in ensuring proper treatment.

Conflicts of interest:

None .

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CASE REPORT

GLOBAL AGEING IS A GROWING PROBLEM FOR ANAESTHESIOLOGISTS: A CASE OF REGIONAL BLOCKS IN A GERIATRIC PATIENT

ABSTRACT

The geriatric patients who needs to emergency surgery increases depending on the ageing world population. These patients frequently have multiple comorbidities such as cardiac disease, diabetes mellitus, chronic obstructive pulmonary disease. Perioperative careful anesthesia management reduce risk factors, morbidities and mortality. Peripheral nerve blocks are preferred in geriatric patients, to protect the state of consciousness, creating minimal changes in hemodynamic and respiratory parameters and postoperative sufficient pain control. Regional anaesthesia suppress surgical stress response. In this case report, we aimed to present an infraclavicular block and spinal anaesthesia combination in a 73 years old, American Society of Anesthesiologists Classification (ASA) IV geriatric patient who underwent emergency orthopaedic surgery due to trauma.

Keywords: Ageing; Anesthesia; Spinal; Emergencies; Geriatrics

OLGU SUNUMU

KÜRESEL YAŞLANMA, ANESTEZİSTLER İÇİN BÜYÜYEN BİR PROBLEM: YAŞLI BİR HASTADA REJYONEL BLOKLAR

Öz

Acil cerrahiye ihtiyaç duyan yaşlı hastalar dünya nüfusunun ihtiyarlamasına bağlı olarak artmaktadır. Bu hastalar çoğu kez kardiyak hastalıklar, diyabetes mellitus, kronik obstruktif akciğer hastalığı gibi birden fazla yandaş hastalığa sahip olmaktadır. Perioperatif dikkatli anestezi yönetimi risk faktörlerini, morbidite ve ölüm oranlarını azaltır. Periferik sinir blokları yaşlı hastalarda, bilinç durumunu korumaları, hemodinamik ve solunumsal parametrelerde minimal değişiklik yapmaları ve operasyon sonrası yeterli ağrı kontrolü sağlamaları nedeniyle tercih edilirler. Rejyonel anestezi ise cerrahi stres cevabını baskılamaktadır. Bu olgu sunumunda travmaya bağlı acil ortopedi cerrahisi geçiren 73 yaşında, Amerikan Anestezi Derneği Klasifikasyonu IV yaşlı bir hastada infraklavikuler blok ve spinal anestezi kombinasyonunun sunulması amaçlanmıştır.

Anahtar sözcükler: Küresel yaşlanma; Spinal anestezi; Acil cerrahi; Yaşlı hastalar

INTRODUCTION

The number of 'elderly' people (>65 years) has increased by three times over the last 50 years and the most rapidly growing age group is that aged 80 years and older (1). As a result of better health care, nutrition, education, and general living standards, the ageing population has increased globally.

It is believed that more than half of the elderly population will require surgical intervention at least once in their remaining life. Steadily increasing numbers of geriatric patients require orthopaedic surgeries because of urgent traumas. In general, they become intolerant towards surgical stress due to decreased functional reserve of organ systems (2). The practise of anaesthesiology is more complex in these patients because of a greater number and difficulty of comorbid conditions.

Regional anaesthetic and analgesic techniques provide physiologic benefits intra-operatively and post-operatively (3). Furthermore these techniques may attenuate the pathophysiology that presents post-operatively.

Here we discuss our regional anaesthesia practices with an infraclavicular block and spinal anaesthesia combination in a geriatric patient who underwent surgery for a left femoral and left radial fracture simultaneously.

CASE

Our patient was a 73-years-old, 156-cm tall American Society of Anesthesiologists (ASA) class IV, female weighing 45 kg. During pre-operative evaluation, she presented with atrial fibrillation, congestive heart failure, chronic lymphocytic leukaemia, diabetes mellitus, hypertension and a history of total thyroidectomy. On physical examination; the sounds of pulmonary auscultation were decreased bilaterally and the heartbeat was arrhythmic. Her medications included metoprolol succinate 25mg, verapamil 120mg, warfarin sodium 5mg, levothyroxine sodium 150mg,

atorvastatin 10mg daily and metformin 500mg twice a daily.

Pre-operative laboratory results revealed the following: haemoglobin: 8.4g/dl, haematocrit: 27.6%, blood sugar: 154mg/dl, blood urea:38mg/dl, serum creatinine:0.7mg/dl. Pre-operative serum electrolytes, platelet count, bleeding time, prothrombin time, activated partial thromboplastin time (aPTT) and international normalised ratio (INR) were normal. Cardiothoracic index was higher on her chest x-ray. Thorax computed tomography (CT) and CT angiography showed that her heart was larger than normal, there were pleural effusion signs in bilateral hemithorax, there was consolidation in the lower lobe and atelectatic changes in the middle right pulmonary lobe. Echocardiography revealed tricuspid insufficiency, pulmonary hypertension, mild mitral insufficiency and an ejection fraction of 50%. Pre-operative blood gases were as follows: pH:7.39, pCO₂:35, pO₂:43.5, SpO₂:76.6, Lac:22, HCO₃:21.9 (Table 1).

In the operating room standard monitoring (electrocardiogram, non-invasive blood pressure, peripheral oxygen saturation) was applied. Information about the procedure was explained to the patient and written consent was obtained.

Preoperatively, the patient's non-invasive blood pressure (NIBP) was 130/94 mmHg, heart rate (HR):103/min, SpO₂: 90% under 2 ldk⁻¹ oxygen (O₂) through a face mask. We planned two surgeries simultaneously, in agreement with the two surgeons, to shorten her operation time. Infraclavicular block and spinal anaesthesia were administered. Initially an infraclavicular block was applied 2cm medial and 2cm inferior to the coracoid process of the scapula with a stimulation needle, via nerve stimulator. The stimulation current was started at 1 mA, with a frequency of 2Hz for 0.1ms and finger and thumb flexion was found at 0.5 mA. After localisation of the plexus brachialis, lidocaine (2%; 10 mL) with levobupivacaine (0.5%; 20 mL) was given. The sensation and motor blocks were adequate at 16thmin.



Second, the patient was placed in the lateral decubitus position. Spinal anaesthesia was applied from the L3-L4 spinal space using a 26gauge atraumatic spinal needle with levobupivacaine (0.5%; 2.5mL). Five minutes later the Bromage anaesthesia score was 3 and the block level was at L1. The operation began 10min later. Our patient was

sleeping during the surgery without any sedation. Maximum block-level was T7. Two orthopaedic surgeons performed both procedures at the same time and the operation time was 135min. The patient underwent surgery without pain, stayed in the recovery room for 1 h, and only needed analgesics 4 h post-operation in the ward (Table 2).

Table 1. Pre-operative and per-operative blood gas results.

	PH	P O ₂	PCO ₂	SPO ₂	Lac	BE
Preoperative	7.39	43.5	35	76.6	22	-2.9
Peroperative	7.39	154	34.5	99.9	6	-3.4

Table 2. NIBP (noninvasive blood pressure), HR (heart rate) and SpO₂ (peripheral oxygen saturation) levels.

	NIBP (mmHg)	HR (beat/dk)	SpO ₂ (%)
Preoperative	130/90	103	90
After infraclavicular block (16.min)	129/99	83	93
After spinal anaesthesia (26.min)	90/53	112	96
Per-operative (60.min)	102/66	78	97
Post-operative (140.min)	103/61	90	99

DISCUSSION

Ageing population steadily increases all around the world. These population require meticulous medical evaluation: their risk factors have to be well described and perioperative management and postoperative care have to be planned (4). Elderly patients who present to emergency services due to a trauma also have chronic diseases (such as cardiac disease, diabetes mellitus, chronic obstructive pulmonary disease). Ageing calcification in rib cartilage and degeneration of the ribcage also have been observed in such patients. The compliance of pulmonary tissue and decrease in functioning of respiratory muscle causes a reduction in total pulmonary volume (5). For this reason, respiratory

problems are major complications in the early post-operative period. Additionally, cardiac morbidity is the most common cause of death after major surgical procedures (6). Peri-operative sympathetic activation has an important role in the development of myocardial ischaemia.

General and regional anesthetic techniques are widely used in clinical practice. These techniques affect early- and late-term morbidity and mortality in high risk geriatric patients. There are some studies show that regional anaesthetic techniques associated with fewer cerebrovascular accidents, and reduced acute postoperative confusion in orthopedic surgery (4,7,8). Also, regional anaesthesia reduce blood loss, improve

peripheral vascular circulation, suppress surgical stress response and provide better post-operative pain control via blocking afferent and efferent signals to and from the spinal cord. Moreover, these techniques may reduce sympathetic activation and short-term mortality (6).

Different approaches exist to produce local anaesthetic blockade of the brachial plexus. In recent studies visualising brachial plexus using ultrasound have become very popular (9,10). Whereas another study pointed out that the nerve localization with ultrasound or neurostimulation did not show any significant differences in anaesthetic efficacy. The infraclavicular block is a safe and simple technique regardless of whether ultrasound or neurostimulation guidance is used for providing surgical anaesthesia of the lower arm. Another advantage of this technique is reduced tourniquet pain during surgery (11). In emergency conditions, such as that in our case,

the infraclavicular block does not require upper limb abduction, and seems to be an interesting alternative to the axillary block.

Functional reserve and compensation ability for physiologic stress are mostly reduced in the geriatric population. This fact affects pre-operative assessment and peri-operative care of elderly patients. When considering major postoperative complications, such as respiratory problems, regional block combinations are the correct choice for geriatric patients with multiple systemic diseases. These techniques provide several beneficial effects in elderly patients with trauma. The choices of regional anaesthesia are important for proper operation and suitable patients, especially considering the increasing numbers of geriatric patients globally. Therefore we aimed to emphasise that regional techniques should be considered and performed more often in the elderly who have even two traumas at different regions at the same time.

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