

Comparison of Pain Management of Geriatric and Non-geriatric Patients who applied to the Emergency Department with Acute Pain

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Submitted: 18.12.2022
Revised: 31.05.2023
Accepted: 31.05.2023

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Keywords: Aged; elderly;
emergency medicine; oligo-
analgesia; pain; pain manage-
ment.



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ABSTRACT

Objective: Pain is the most common reason for the emergency department (ED) visits of geriatric patients. Pain management might be challenging in this age group of patients which may spur delays in pain treatment and oligoanalgesia. In addition, failure to provide effective pain control in geriatric patients can lead to delirium, depression, and prolonged hospital stay. The aim of the study was to compare the changes in pain scores of geriatric and non-geriatric patients in the first 60 min who applied to the ED with acute pain.

Methods: This prospective study was conducted between January 2022 and March 2022 in an academic ED. All patients older than 18 years old who presented with acute pain were enrolled in the study. The primary outcome measure of the study was determined as the alteration in pain levels between geriatric and non-geriatric groups at the visual analog scale (VAS) at 0–60th min. The secondary outcome measures of the study were to determine the opioid doses between the two groups and the alteration in pain levels between the two groups at the VAS at 0–20th min and 0–40th min.

Results: The change in pain levels did not differ significantly between the groups at 0–60th, 0–20th, and 0–40th min. Opioid doses were also not significantly different among the two groups.

Conclusion: The findings of this study indicate that oligoanalgesia is not a significant risk neither for geriatric nor for non-geriatric patients in the ED population.

INTRODUCTION

The number of emergency department (ED) visits of patients older than 60 years old increased by 36% in the USA during the 10-year period after 2007.^[1] Since the elderly population is expected to increase in the upcoming years, the application rate to EDs is expected to increase gradually.^[2] Pain is the most common symptom of the ED visits of these patients.^[3] Geriatric patients are admitted to EDs with pain having a wide range of admissions, from COVID-19 to acute appendicitis.^[4,5] Effective management of this symptom is related to shorter hospital stays, less mortality and morbidity, lower myocardial ischemia rates, and decreased health expenses.^[6-8] However, unrelieved pain might induce delirium and an impaired cognitive state.^[9] In addition, this has been linked to increased readmission, falls, depression, and functional disorder rates.^[10,11] Nevertheless, pain in the elderly is mostly managed inad-

equately in EDs.^[12]

Pain management might be challenging among the elderly patients. Since some of the sensation mechanisms decrease with advanced age, pain perception changes in the older age groups.^[13] In addition, owing to the physiologic changes that occur with age that alter the absorption, distribution, metabolism, and excretion, drug pharmacokinetics change, and most analgesics might impair the cognitive status of the elderly patients.^[14] Furthermore, the effects of analgesics have a higher risk of adverse events in the elderly patients. Non-steroidal anti-inflammatory drug (NSAID)-induced gastrointestinal bleeding and kidney failure rates are higher in the elderly patients.^[15,16] In addition, elderly patients might face the lengthened and stronger effects of opioid drugs.^[17] Often in the face of all these factors, physicians might abstain from the application of the appropriate analgesic treatment to the elderly patients.

Pain assessment might also be difficult in the elderly patients. Since comorbid diseases and cognitive impairment might render pain assessment difficult in elderly patients, pain documentation rates are lower in this age group.^[18] Therefore, providing appropriate treatment on time is crucial for the elderly patients. The aim of the study was to compare the changes in pain scores of geriatric and non-geriatric patients within the first 60 min who applied the ED with acute pain.

MATERIALS AND METHODS

Study Design and Settings

This was a single-center, prospective, observational study. The center was an academic ED with 250.000 visits annually. The study was approved by the local ethics committee (2021–131).

Study Order and Population

The study was conducted with the patients who visited ED for acute pain between January 2022 and March 2022. All patients older than 18 years old who presented with acute pain were enrolled in the study. Acute pain was defined as sudden pain that lasts <4 weeks.^[19] At least 13 mm decrease in pain scores was accepted as significant in accordance with the previous studies.^[20] The geriatric group was defined as patients older than 60 years old in accordance with the United Nations' definitions.^[21] Patients who were pregnant, who had communication problems, and who had advanced liver or renal failure were excluded from the study.

Study Protocol

All of the patients who applied to the ED due to acute pain were evaluated for eligibility for the study and asked for consent. Written informed consent was obtained from all of the participants who were enrolled in the study. All of the patients were evaluated and managed by an attending physician who was blinded to the study. The nurses who administered the drugs were also blinded to the study. After the consent was obtained demographics, clinical findings, and all of the analgesic treatments that were implemented to the participants were recorded on the pre-designed data sheets. The study consisted of two groups of participants who were older and younger than 60 years old. Pain scores of the participants were measured at the 0th, 20th, 40th, and 60th min using the 100 mm visual analog scale (VAS) in accordance with the previous recommendations.^[22]

Outcome Measures

The primary outcome measure of the study was determined as the alteration in pain levels between geriatric and non-geriatric groups at the VAS at 0–60th min. The secondary outcome measures of the study were to determine the opioid administration rates between the two groups, the rate of significant relief in pain scores between the two groups, and the alteration in pain levels between

the two groups at the VAS at 0–20th min and 0–40th min.

Primary Data Analysis

Statistical analyses were performed using SPSS version 22 (SPSS, Inc.; Chicago, Illinois USA). The normality of the distribution of the data was determined by the Kolmogorov–Smirnov test. Descriptive statistics were presented as a mean±standard deviation for parametric variables and as a median and inter-quartile range (IQR) for non-parametric variables. The normally distributed data were analyzed with the Student's t-test, whereas the data showed non-normal distribution was compared with the Mann–Whitney U-test. The Chi-square test was used to analyze categorical variables in independent groups. If at least one cell in the contingency tables of the expected value was <5, Fisher's exact test was used. $p < 0.05$ was considered statistically significant.

RESULTS

During the study period, one hundred and twenty patients were evaluated for eligibility for the study. Twenty-five patients were excluded for various reasons and a total of ninety-five patients were included in the study. The mean age in the geriatric group was 66.38 ± 5.14 , whereas in the non-geriatric group, it was 39.23 ± 11.27 . There were 8 (38.1%) males in the geriatric group, whereas 37 (50%) were in the non-geriatric group. Hypertension, coronary artery disease, and diabetes mellitus rates were significantly higher in the geriatric group ($p = 0.00$, $p = 0.03$, and $p = 0.002$, respectively). The demographic characteristics of each group were presented in Table 1.

The median baseline pain score in the geriatric group was 80 (IQR, 30–100), whereas, in the non-geriatric group, it was 90 (IQR, 40–100). The median pain score at the 60th min in the geriatric group was 30 (IQR, 0–100) and 25 (IQR, 0–100) in the non-geriatric group (Figure 1).

The median pain change at 0–60th in the geriatric group was 60 (IQR: –20–75) and 50 (IQR: –10–100) in the non-geriatric group. The change in pain levels did not differ significantly between the groups at 0–60th, 0–20th, and 0–40th min (Table 2). Opioid and NSAID administration rates were also not significantly different between the two groups.

The pain scores of the geriatric group decreased significantly in 20 (95.2%) of the geriatric group and 68 (91.9%) of the non-geriatric group ($p = 1$). The pain of the geriatric group totally relieved in 1 (4.8%) of the geriatric group and 15 (20.3%) of the non-geriatric group ($p = 0.11$).

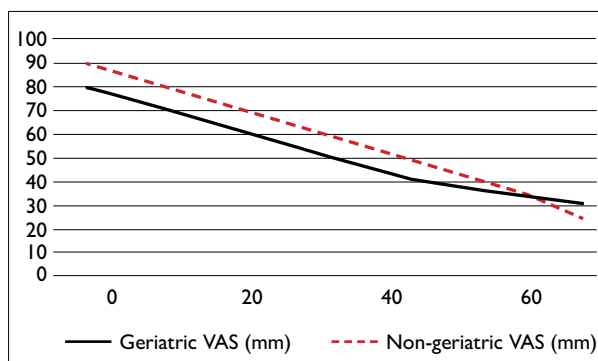
DISCUSSION

The results of the study showed that the pain management of the geriatric and non-geriatric patients in the ED did not differ from each other. Regardless of age, the pain relief of all patients was similar. In addition, physicians did not refrain from the administration of neither opioids

Table 1. Demographic data of study patients

Characteristics	Geriatric	Non-geriatric	p-values
Age (Mean, SD)	66.38 (5.14)	39.23 (11.27)	0.000
Male (n, %)	8 (38.1)	37 (50)	0.429
Education (n, %)			0.008
Primary School or less	16 (76.2)	32 (43.2)	
High School or more	5 (23.8)	42 (56.8)	
Comorbidity (n, %)			
COPD	1 (5)	1 (1.4)	0.318
Asthma	2 (10)	1 (1.4)	0.052
Diabetes Mellitus	7 (35)	6 (8.1)	0.002
Hypertension	10 (50)	5 (6.8)	0.000
CAD	3 (15)	2 (2.7)	0.031
Cancer	2 (10)	1 (1.4)	0.052
Drugs (n, %)			
Acetaminophen	1 (5)	5 (6.8)	0.777
NSAIDs	10 (50)	33 (44.6)	0.790
Tramadol	9 (45)	35 (47.3)	0.856
Fentanyl	1 (5)	2 (2.7)	0.606

COPD: Chronic obstructive pulmonary disease; CAD: Coronary artery disease; NSAIDs: Non-steroidal anti-inflammatory drugs.

**Figure 1.** Geriatric and non-geriatric groups pain change graph

nor NSAIDs during the pain management of geriatric and non-geriatric patients.

Due to the difficulties in the pain management of the elderly as evaluating the patients, physiologic changes that increase drug adverse effects and risks originating from the narrow therapeutic index of the analgesics, pain management of geriatric patients is challenging. Therefore, many researches were conducted on this issue, but the findings

of these studies were controversial. Ko et al. reported that oligoanalgesia was more common in geriatric trauma patients.^[23] In accordance with Ko et al., Hwang et al. reported that the reduction in pain scores was lower in the geriatric population than in the younger adults.^[24] In contrast, Cinar et al. reported that the risk of oligoanalgesia in geriatric patients was not greater than the younger adults.^[25] The results of our study were consistent with this study, in which both evaluated the patients prospectively unlike most other studies. In this study, the rates of oligoanalgesia were very low in both age groups. Pain perception is subjective and may be affected by lots of factors. One of the differences of this study from the previous literature was the country that the study was conducted. Therefore, this discrepancy from other studies might be attributed to the cultural differences of the participants.^[14] In addition, our continuous clinical educational sessions on pain management might have increased the pain management skills of the physicians.

The higher rates of adverse effects of opioids in geriatric patients might render physicians abstaining from opioid administration.^[26] Cinar et al. and Hwang et al. reported

Table 2. Pain change (delta) values of the groups at 0–20th, 0–40th and 0–60th min

	Geriatric	Non-geriatric	p-values
0–20th (median, IQR)	20 (18)	20 (20)	0.390
0–40th (median, IQR)	40 (15)	35 (23)	0.411
0–60th (median, IQR)	60 (28)	50 (30)	0.342

IQR: Interquartile range.

that lower doses of opioids were administered to geriatric patients, whereas Quattromani et al. reported that opioid doses were similar among different age groups.^[24-27] The results of this study demonstrated that geriatric patients received similar doses of opioids. Methods of the studies and experiences of the physicians and characteristics of the patients might have caused the differences in the results.

Limitations

The study had several limitations. First, this was a single-center study. Therefore, the results cannot be generalized. Second, specific pain types were not evaluated in this study. However, pain management does not change depending on the pain type such as somatic or visceral pain.^[12] Third, after a pain treatment, it is prominent to evaluate whether the patients maintain their daily activities or not but, in this study, only 16.8% of the participants relieved totally and the others have not been evaluated whether they can maintain their daily activities or not. However, this issue is beyond the scope of the study. Finally, the patients who had communication problems were excluded from the study; therefore, oligoanalgesia is still a plausible risk factor for intubated patients and patients who have illnesses that decrease the cognitive level of the patients. Therefore, this issue should be evaluated in future studies.

Conclusion

The findings of this study indicate that oligoanalgesia is not a significant risk neither for geriatric nor non-geriatric patients in the ED population. In addition, physicians do not abstain from administering opioids to geriatric patients. Future multicenter studies should focus on determining the factors that affect the pain management of physicians in the ED.

Ethics Committee Approval

This study approved by the Kocaeli Derince Training and Research Hospital Clinical Research Ethics Committee (Date: 25.11.2021, Decision No: 2021-131).

Informed Consent

Retrospective study.

Peer-review

Externally peer-reviewed.

Authorship Contributions

Concept: E.Ş., A.E.Ö.; Design: A.E.Ö., O.K.; Supervision: A.E.Ö.; Data: O.K.; Analysis: E.Ş.; Literature search: A.E.Ö., E.Ş.; Writing: A.E.Ö., O.K., E.Ş.; Critical revision: E.Ş., A.E.Ö.

Conflict of Interest

None declared.

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Akut Ağrı Şikayeti ile Acil Servise Başvuran Geriatrik ve Geriatrik Olmayan Hastalarda Ağrı Tedavisinin Karşılaştırılması

Amaç: Ağrı, geriatrik hastaların acil servis başvurularının en sık nedenidir. Ağrı tedavisinin gecikmesi ve oligoanaljezi bu yaş grubundaki hastalarda ağrı yönetimi zor olabilir. Ayrıca geriatrik hastalarda etkin ağrı kontrolünün sağlanamaması deliryuma, depresyona ve hastanede yatış süresinin uzamasına neden olabilir. Bu çalışmanın amacı, acil servise akut ağrı şikayeti ile başvuran geriatrik ve geriatrik olmayan hastaların ilk 60 dakikada ağrı skorlarındaki değişimi karşılaştırmaktır.

Gereç ve Yöntem: Bu çalışma prospektif olarak, üçüncü basamak bir acil serviste Ocak 2022 ile Mart 2022 arasında gerçekleştirildi. Akut ağrı şikayeti ile başvuran 18 yaşından büyük tüm hastalar çalışmaya alındı. Çalışmanın birincil sonuç ölçüsü, görsel analog skalasında 0. ila 60. dakikalarda geriatrik ve geriatrik olmayan gruplar arasındaki ağrı düzeylerindeki değişiklik olarak belirlendi. Çalışmanın ikincil sonuç ölçütleri; iki grup arasındaki opioid dozlarını ve iki grup arasındaki ağrı düzeyindeki değişimi 0. ila 20. dakikalar ve 0. ila 40. dakikalar arasında görsel analog skala üzerinden belirlemek idi.

Bulgular: 0-60, 0-20 ve 0-40. dakikalarda ağrı düzeyindeki değişim gruplar arasında anlamlı farklılık göstermedi. Opioid dozları da iki grup arasında önemli ölçüde farklı değildi.

Sonuç: Bu çalışmanın bulguları, merkezimizde oligoanaljezinin acil servis popülasyonundaki hem geriatrik hem de diğer hastalar için önemli bir risk olmadığını göstermektedir.

Anahtar Sözcükler: Yaşlı hasta; geriatri; acil tıp; ağrı yönetimi; oligoanaljezi.