ORIGINAL RESEARCH

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Pain Management in Emergency Medicine

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ABSTRACT Objective: Provision of sufficient analgesia is the most important target in the emergency department; however, the vast majority of the patients in the emergency department comprise the insufficient analgesia use group, referred to as the oligoanalgesia group. Therefore, patients underwent evaluation of pain scores through measurements at the time of presentation and at the time of discharge in order to undergo identification of the level of satisfaction, and in this way, we planned to evaluate pain management in the emergency department. **Material and Methods:** A total of 2504 patients had been admitted to the emergency department with the complaint of pain. This double-blind prospective study was approved by the ethics committee of the hospital (25.02.2008/057). Among the patients presenting with pain, 876 met the inclusion criteria and were therefore included in the study. No information regarding the study was given to the doctors or the patients in order to avoid any influence on the outcomes. The treatment cards included the complaints on admission, pain assessment, analgesic use, diagnoses, the educational level and professions of the patients, the length of stay in the emergency department, the route of drug administration and the patient satisfaction. Sixteen groups of analgesic drugs were recorded throughout the study. Drugs referred to as adjuvant analgesics were also included in this group. **Results:** The mean age of the patients was 40.7 (18-88), and 465 of the patients (%53.1) were female. The most frequent type of pain was abdominal pain, which was observed in 191 patients (21.8%). The most frequently used drugs were of the NSAID group. A group of patients with pain, 21.1% were not given any analgesic treatment and 62.6% were discharged within one hour following the administration of a drug therapy. The mean pain score on admission was 7 and on discharge, the score was 5. The length of stay in the emergency department was directly correlated to the change in pain severity. No correlation was determined between the pain severity and age, gender, educational level or the duration of pain. **Conclusion:** Oligoanalgesia is still a major health problem in the emergency units. One purpose of the treatment should also be patient satisfaction, and the analgesic treatment should be given in the absence of contraindications. According to our study, the positive correlation between patient satisfaction and analgesia is quite strong. In particular, insufficient use of opioids should be reconsidered at our emergency department. The education system approach to pain by the emergency physician should be reconsidered.

Key Words: Analgesics; pain management; emergency medicine; patient satisfaction

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Pain is an unpleasant sense derived from a certain area of the body due to a tissue damage or not, and is related to the previous experiences of the individual.[1] Pain management and proper treatment are important elements of emergency medicine practice. However, the common approach for pain management is support of the vital functions and the treatment of the formed pathology.[2,3] Pain is the most common reason for seeking medical advice and constitutes 78% of all admissions to emergency

departments.[4-6] Providing sufficient analgesia is the most important target in the emergency departments; however, the vast majority of the patients in emergency units are composed of the insufficient analgesia use group, referred to as the "oligoanalgesia" group.[3] Hence, we aimed to investigate the frequency of analgesic treatment in the emergency departments and the patient satisfaction by determining the pain scores on admission and discharge.

MATERIALS AND METHODS

The study was carried out at the emergency department between May 9 and May 12 in 2011. The protocol and the forms of the study were prepared and presented to the ethical committee of the hospital. Indication of medical treatment was decided by the primary physician of the patient who was in charge of the patient in the emergency department. The physicians were not informed about the study in order to avoid any influence on the study results.

INCLUSION CRITERIA

Volunteering to participate in the study and being 18 years of age or above were the primary inclusion criterias. The severity of the pain was reported using the NRS (Numerical Rating Scale) (0: no pain, 10: the worst imagined pain) scoring system.

EXCLUSION CRITERIA

- Painless patients,
- under 18 years of age,
- not volunteering to participate in the study,
- patients experiencing the pain for 3 months or longer,
- mentally retarded patients or those receiving neuropsychiatric therapy,
- pregnancy, intoxication, multi-trauma,
- a history of drug abuse or alcohol use,
- use of analgesics at home,
- opioid intake in the last week,
- emergency situations (life-threatening events),
- an allergic profile or dementia,
- previous inclusion in the study.

The evaluation was made upon admission of the patients to the hospital prior to NRS, and it was completed when the patients left the hospital. Patient satisfaction was also evaluated and scored when discharged with NRS. The emergency physicians has not received any training prior to the study. Furthermore, the doctors were not informed about the study, so as to determine the approach towards the current pain.

The patient information form was filled in by another senior doctor when the patient was first admitted to the emergency department. The discharged patients were re-evaluated by the same doctor and the doctor who was not informed about this evaluation.

STATISTICAL ANALYSIS

Analysis of the data was performed using the SPSS for Windows, version 11.5 (SPSS Inc., Chicago, IL, United States). Metric discrete variables were shown as mean ± standard deviation (SD) or median (min-max) where applicable. The number of cases and percentages were used for the categorical data. The Wilcoxon Sign Rank test was utilized in order to evaluate whether the differences in the NRS between before and after treatment were statistically significant or not.

RESULTS

A total of 2504 patients had been admitted to the emergency department with pain. 1023 (34.9%) did not meet the pre-defined inclusion criteria and 605 (20.6%) did not volunteer to participate in the study, all these patients were excluded. A total of 876 (29.9%) patients were included in the study.

Among the 876 participants, 465 (53.1%) were female and 411 (46.9%) were male.Mean age was 40.7±16.2 and the age range was 18-88 years. Five hundred and ninety-one patients (67, 4%) were in the 20-49 age range.

The distribution of the participants according to their complaints were as follows: abdominal pain in 191 (21.8%), headache in 135 (15.45), trauma

(including injury or contusion, excluding multiple trauma) in 107 (12.2%), back and neck pain in 118 (13.5%), chest pain in 75 (8.6%), joint pain in 73 (8.3%), throat ache in 67 (7.6%), lower extremity pain in 46 (5.3%), upper extremity pain in 27 (3.1%), renal colic in 30 (3.4%), and ear or tooth ache in the minority of the patients.

Six-hundred and ninety-one of 876 patients (78.9%) with pain were medically treated by the emergency unit physicians, whereas 185 (21.1%) were not treated. The most frequently used group of drugs was NSAIDs (diclofenac Na, metamizole Na, lornoxicam) and the drugs had been administered to 418 (47.8%) patients. Glycerol trinitrate, was given to 2 patients with angina pectoris (0.2%), and opioid group analgesics were given to 4 patients [fentanyl: 2 patients (0.2%), tramadol: 2 patients (0.2%)], and these were determined to be the least used group of drugs. It was observed that H2 receptor blockers were preferred more frequently in the treatment of stomach ache compared to proton pump inhibitors [Number of patients receiving H2 receptor blockers: 165 (18.8%), number of patients receiving proton pump inhibitors: 30 (3.4%)]. Diazepam, which is known to be used in neuropsychiatric disorder-related pains, was used in 5 patients (0.6%), and pheniramine hydrogen maleate had been used in 3 (0.3%) patients as intent-to-treat. Paracetamol was used in 13 patients (1.0%), and lidocaine was used in 3 (0.3%). The mean duration of stay at the emergency unit upon hospital admissions was 60 minutes. The patients had defined different durations of pain: 55.6% (487 patients) had defined 12 hours or longer and 12.3% (108 patients) had defined 2 hours or shorter periods for their pain (The shortest and longest time is specified). The route of drug administration was intramuscular in 443 patients (50.6%), which was the most frequent route of medical treatment.

The mean Numeric Rating Score (NRS) on admission was 7 (range:1-10); and the NRS upon discharge was 5 (range: 0-10). The difference between the NRS scores on admission and discharge was statistically significant (p<0,001). No statistically significant correlation was observed between the change in the NRS score and the age (r=-0,043 and p=0,198), educational status (r=-0,019 and p=0,569), or the duration of pain (r=-0,061 and p=0,073). The NRS was found to be lower in patients with a longer duration of emergency department stay (r=0,191 and p<0,001). The longest duration of emergency unit stay was observed in patients who had presented with the complaint of chest pain, and was 150 minutes (range: 20-560 minutes) (Table 1).

TABLE 1: Distribution of patients according to age, gender, complaint of admission, duration of emergency department and given treatment rate.

Complaint on admission	Age (Year)	Gender F/M	Time of Stay in Emergency (minute)	Patients were given treatment
Headache	42.7±15.5	86/49	50 (11-300)	120 (88.9%)
Abdominal pain	39.5±17.0	109/82	100 (20-300)	179 (93.7%)
Chest pain	47.1±16.8	32/43	150 (20-560)	69 (92.0%)
Neck/back pain	40.6±13.6	58/60	55 (6-300)	111 (94.1%)
Renal colic pain	42.3±18.6	14/16	60 (20-180)	26 (86.7%)
Joint pain	41.5±16.6	38/35	50 (14-180)	64 (87.7%)
Throat ache	32.8±12.3	44/23	35 (15-240)	46 (68.7%)
Upper ext. pain	43.0±17.4	14/13	40 (20-360)	17 (63.0%)
Lower ext. pain	40.3±13.7	16/30	47.5 (15-120)	29 (63.0%)
Trauma	40.4±17.7	50/57	60 (13-600)	25 (23.4%)
Tooth ache	40.5±7.8	2/0	45 (15-75)	2 (100.0%)
Ear pain	26.6±8.6	2/3	50 (20-60)	3 (60.0%)

F: Female, M: Male.

It was observed that the thiocholcicoside (as adjuvant analgesic; for its myorelaxant property) group of muscle relaxants were given in combination with analgesic drugs in 214 patients (24.4%) with neck and back pain. Only 2 patients were given fentanyl as treatment. Diazepam was preferred as adjuvant analgesic commonly in patients with headache. The distribution of the patients according to their complaints on admission and the analgesics drugs administered has been presented in Table 2.

The largest change in the NRS of the patients according to the complaints on admission was observed in the chest pain group. No significant change was observed in the NRS scores in the trauma group. According to these results, it may be concluded that the approach to chest pain in our emergency unit was successful; however, the approach towards trauma patients had been unsuccessful (Table 3). The NRSs on admission were as follows: 77 patients (8.8%) had mild pain (scores:1-4), 460 patients (52.5%) had moderate pain (scores: 5-7), and 339 patients (38.7%) had severe pain (scores: 8-10). The NRS on discharge were as follows: 300 patients (45.7%) had mild pain (scores: 1-4), 322 patients (28.9%) had moderate pain (scores: 5-7), and 154 patients (17.6%) had severe pain (scores: 8-10).

At the end, 22% of the patients had left the emergency department unsatisfied. The unsatisfied group included patients with trauma (only 25% of patients had received medical treatment), upper and lower extremity pain (29% and 17%), toothache (2%) and renal colic (26%), and the satisfied group included those with abdominal pain (93,7% of the patients had been given medical treatment) and chest pain (92%).

DISCUSSION

Pain is the most frequent reason for admission to the emergency departments.[5,9] In an epidemiological study conducted in Sweden, the prevalence of chronic pain was found to be approximately 54%.[10] In 1989, Wilson and Pendleton used the term "oligoanalgesia" in order to define the pain and the failure in pain management.[11] Sufficient analgesia is the target in patients with pain; however, "oligoanalgesia", which is the insufficient use of analgesics, may be observed in a vast majority of the patients in emergency departments (ED).[11,12]

The mean age was 40.7±16.2 (range: 18-88 years) in our study. It was 62 (18-96) in the study of Allione et al., 39 (2-91) in the study of Singer et al., and 34.5 (8-91) in the study of Knox et al. The mean age in these studies was similar to our study, although patients younger than 18 years of age had also been included.[13-15] This was due to the fact that most of the patients included belonged to the 20-49 age group.

The most frequent reason on admission was abdominal pain in our study. This was extremity pain in the study of Singer et al. Trauma was the first and abdominal pain was the second most frequent reasons in the study of Todd et al.The rate of admissions due to chest pain was similar to other studies.[14-16] Conventionally, the surgeons believe that abdominal pain should not be interfered in the first examination in order not to mask the complications.[17] In the present studies, use of opioid analgesia seems to be a safe, effective and humanist way of abdominal pain management in emergency departments.[18] The consumption of opioids is accepted as an important indicator of the quality of pain management. The opioid consumption in Italy is one of the least levels among economically developed countries. It was mentioned that precautions had been planned in order to control the possible reasons of the trend in the lack of systematic training of the healthcare professionals concerning pain management, opiophobia, and the misuse of such drugs. Despite the attitude of the clinicians, misinformation about opioid analgesics or opioid safety has contributed to this phenomenon.[15]

Opioid use was in the first rank in the study of Singer et al. (59%). The second rank belonged to the NSAIDs (22%).[14] Morphine was the most frequently used drug in the study of Todd et al. Forty-

TABLE 2a: Distribution of the patients regarding treatment according to the complaints on admission.

	Headache		Abdominal pain		Chest pain		Back/neck pain		Joint pain	
	N	%	n	%	n	%	n	%	n	%
NSAID	86	63.7	35	18.3	14	18.7	105	89.0	58	79.5
Thiocolchicoside	32	23.7	7	3.7	9	12.0	84	71.2	35	47.9
Acetysalicylic acid	3	2.2	0	0.0	50	66.7	0	0.0	0	0.0
Ranitidine	10	7.4	118	61.8	12	16.0	2	1.7	4	5.5
Hyoscine N-Bromid	2	1.4	86	45.1	1	1.3	2	1.7	2	2.8
Hydrotalcite	1	0.7	16	8.4	1	1.3	0	0.0	0	0.0
Fentanyl	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Pantoprazole	1	0.7	23	12.0	4	5.3	0	0.0	0	0.0
Metoclopramide	34	25.2	99	51.8	13	17.3	2	1.7	7	9.6
Lidocaine	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Captopril	12	8.9	0	0.0	0	0.0	0	0.0	0	0.0
Paracetamol	1	0.7	1	0.5	0	0.0	0	0.0	3	4.1
Tramadol	0	0.0	0	0.0	0	0.0	1	0.8	0	0.0
Diazepam	5	3.7	0	0.0	0	0.0	0	0.0	0	0.0
Glycerol trinitrate	0	0.0	0	0.0	2	2.7	0	0.0	0	0.0
Phenyramine hydrogen Maleate	0	0.0	0	0.0	1	1.3	0	0.0	0	0.0
TOTAL	135	100.0	191	100.0	75	100.0	118	100.0	73	100.0

TABLE 2b: Distribution of the patients regarding treatment according to the complaints on admission.

	Throat ache		Upper ext. pain		Lower ext. pain		Trauma		Renal colic pain	
	n	%	n	%	n	%	n	%	n	%
NSAID	42	62,7	16	59,3	28	60,9	15	14,0	14	46,7
Thiocolchicoside	7	10,4	10	37,0	16	34,8	7	6,5	6	20,0
Acetylsalicylic acid	0	0,0	1	3,7	0	0,0	0	0,0	0	0,0
Ranitidine	3	4,5	0	0,0	0	0,0	6	5,6	10	33,3
Hyoscine N-Bromide	0	0,0	0	0,0	1	2,2	0	0,0	12	40,0
Hydrotalcite	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Phentanyl	0	0,0	0	0,0	0	0,0	1	0,9	1	3,3
Pantoprazole	0	0,0	2	7,4	0	0,0	0	0,0	0	0,0
Metochlopramide	4	6,0	0	0,0	1	2,2	7	6,5	9	30,0
Lidocaine	0	0,0	1	3,7	0	0,0	2	1,9	0	0,0
Captopril	0	0,0	1	3,7	0	0,0	0	0,0	0	0,0
Paracetamol	4	6,0	0	0,0	0	0,0	0	0,0	0	0,0
Tramadol	0	0,0	0	0,0	0	0,0	1	0,9	0	0,0
Diazepam	0	0,0	0	0,0	0	0,0	0	0,0	0	0
Glycerol trinitrate	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Phenyramine hydrogen maleate	1	1,5	0	0,0	0	0,0	0	0,0	0	0,0
TOTAL	67	100,0	27	100,0	46	100,0	107	100,0	30	100,0

TABLE 3: According to complaints of patients; NRS values at first examination and NRS values at discharge.

Complaint on admission	NRS on admission	NRS on discharge	P-value †	Change in NRS
Headache	7 (3-10)	5 (0-10)	<0,001	-2 (-10-0)[a]
Abdominal pain	6 (1-10)	4 (0-10)	<0,001	-2 (-10-1)[a,b,c]
Chest pain	6 (3-10)	4 (0-10)	<0,001	-3 (-8-1)[a,b,c]
Neck/back pain	7 (3-10)	5 (0-10)	<0,001	-2 (-10-3)[a]
Renal colic pain	8 (5-10)	6 (0-10)	<0,001	-2 (-8-2)[d]
Joint pain	7 (3-10)	5 (0-10)	<0,001	-2 (-8-0)[a]
Throat ache	6 (2-10)	5 (0-10)	<0,001	-1 (-10-0)
Upper ext. pain	6 (3-10)	4 (0-10)	<0,001	-2 (-8-0)[d]
Lower ext. pain	7 (3-10)	5 (2-10)	<0,001	-1 (-5-0)
Trauma	8 (2-10)	7 (1-10)	<0,001	0 (-8-7)
Tooth ache	10 (10-10)	9 (8-10)	0,317	-1 (-2-0)
Ear pain	6 (4-9)	5 (4-6)	0,102	-2 (-4-0)

† Comparisons of NRSs on complaints during admission and discharge

a: Statistically significantly different from the trauma group T (p<0,001); b: Statistically significantly different from the throat ache group (p<0,01); c: Statistically significantly different from the lower extremity pain group (p<0,05); d: Statistically significantly different from the trauma group (p<0,05).

eight percent of the patients got opioid treatment in the study of Neighbor et al., whereas only 0.9% of the patients (only one patient) with trauma got opioid treatment.[15,19] This rate clearly demonstrates that opioid use is insufficient in our emergency department. In the study of Akarca et al. opiate use has increased by 13.3%. Another similar reason is the common use of non-steroidal anti-inflammatory drugs (NSAIDs), it is believed that this group of agents has adequate pain relief or application results may be an attempt to discharge the patient without being thoroughly evaluated.[20]

Similar to the study of Allione et al., the most frequently used drug was NSAIDs in our study (41%).13 In the study of Serinken et al, Diclofenac sodium was the most commonly chosen NSAID administered via the IM route (n = 195, 96%), while meperidine was the most common opiate preferred in the sample (n = 72, 94.7%).[21]

The route of administration in the study of Singer A.et al. was 52% oral, 39% IV, and 5% IM, and the most frequent routes of administration were IV, oral and IM in the study of Allione et al., respectively.[13,14] Although the IM route of administration was the least frequent in both studies, as in our study (50,6%), in study of Serinken et al., IM administration of non-steroidal anti-inflammatory drugs (NSAIDs) was the most common treatment undertaken in the ED (86.4%).[21] The IM route is not commonly preferred in pain management in the emergency units; however, it is still a common route in our study. According to these two studies, excessive IM application mode of treatment has been identified as one of the deficiencies in the emergency medical training.

In our study, the decrease in NRS on discharge compared to the NRS on admission was similar to the rates observed in the study of Todd et al. including 842 patients.[15] Although this decrease was statistically significant in our study, it is not accepted as a clinically significant indicator due to the minimal changes of pain observed in previous studies.[16] The analgesic intake was similar among different age, gender and race groups in our study. Different to other studies, it was observed that the pain scores were higher among women. No statistical correlation was observed between the duration of pain and NRS. However, a significant correlation was observed between the duration of emergency unit stay and patient satisfaction.

In 2000, 75% of the admissions to the emergency clinics of Guru and Dubinsky were due to

moderate to severe pain, and 61% were discharged with the same degree of pain.[22] Seventy -four percent of the patients in the study of Todd et al. had been discharged with pain.[15] In our study, 22% of the patients were discharged without pain, 45.7% were discharged with mild pain and 46.5% were discharged with moderate to severe pain. The Likert scale was used to measure the patient satisfaction. This rate demonstrated that the patients were discharged with less pain compared to other studies.

A correlation was observed between the number of patients who requested analgesic administration and the severity of pain in the study of Singer A.et al., whereas none of the patients rejected analgesic administration in our study.[14] There was a group of patients who had requested analgesic use, but were rejected by the physicians, the majority of whom had traumas. Similar to our study, the reduction in the pain scores was minimal in the study of Todd et al.; however, the rate of patient satisfaction was high.[15] Previous studies have demonstrated that all the patients presenting to the emergency units with the complaint of pain should be supported regardless of the pain severity, and this was the major determinant of patient satisfaction.[14]

LIMITATIONS

An education program on the provision of local treatment in the emergency department had not been given and no other programs were provided for improved pain management during the study period. We did not determine the reasons why some patients did not get analgesic treatment despite having desired analgesics at the ED. We did not collect data on the non-pharmacological therapies that are often used in patients with pain, such as ice or heat.

CONCLUSION

Pain is the most common symptom in patients presenting to the emergency department. Oligo analgesia is a major health problem in the emergency units. One purpose of the treatment should also be patient satisfaction and treatment should be given in the absence of contraindications. The positive correlation between patient satisfaction and analgesia is quite strong. Furthermore, insufficient opioid use in the emergency units should be re-considered. Further studies are required for the use of analgesia at the emergency department. We believe that education should be given about pain management in the emergency department.

Conflict of Interest

Authors declared no conflict of interest or financial support.

Authorship Contributions

Idea/Concept: Constructing the hypothesis or idea of research and/or article: Aynur Yurtseven; Design: Planning methodology to reach the conclusions: Aynur Yurtseven, Ömer Faruk Demir; Control/Supervision: Organizing, supervising the course of progress and taking the responsibility of the research/study: Umut Yücel Çavuş, Aynur Yurtseven; Data Collection and/or Processing: Taking responsibility in patient follow-up, collection of relevant biological materials, data management and reporting, execution of the experiments: Aynur Yurtseven, Sinan Yıldırım, Mehtap Kaynakçı Bayram; Analysis and/or Interpretation: Taking responsibility in logical interpretation and conclusion of the results: Aynur Yurtseven, Sinan Yıldırım; Literature Review: Taking responsibility in necessary literature review for the study: Aynur Yurtseven Ömer Faruk Demir; Writing the Article: Taking responsibility in the writing of the whole or important parts of the study: Aynur Yurtseven, Ömer Faruk Demir, Umut Yücel Çavuş; Critical Review: Reviewing the article before submission scientifically besides spelling and grammar: Umut Yücel Çavuş; References and Fundings: Providing personnel, environment, financial support tools that are vital for the study: Aynur Yurtseven; Materials: Biological materials, taking responsibility of the referred patients: Aynur Yurtseven.

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