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RESEARCH ARTICLE

MUSCULOSKELETAL PAIN MANAGEMENT IN THE EMERGENCY DEPARTMENT

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Abstract

Introduction: The intensity of acute musculoskeletal pain is underestimated by health providers. Analgesia in adults that receive treatment for acute musculoskeletal pain varies from 11-29%. The timely and effective treatment of pain should become priority for the adequate pain management.

Aim: The aim of the present study was to explore musculoskeletal pain management in the emergency department (ED).

Material and Method: This is a descriptive study. The studied sample consisted of 82 patients, who admitted in the ED of Athen's general hospital, due to acute musculoskeletal pain. For data collection, a special designed registration form was used. Related measurements were completed at two time points; the first time point was during patients' admission to ED and the second one, 30 minutes post treatment or post ED discharge.

Results: Patients average pain score was 7.25 ± 1.85 (first time point) and 3.76 ± 2.66 (second time point). Analgesia was provided to 51.2% of the sample and non-invasive methods were used in 51.2%. As for the frequency of the administrated drugs, analgesics were mostly preferred (29.3%), nonsteroidal anti-inflammatory drugs (NSAIDs) at 25.6% and opioids were used only at 9.8%. The mean time to first anministrated analgesic therapy was 16.56 ± 32.89 min.

Conclusions: In spite of the extensive research and international guidelines for pain management, the fulfillment of the patients' expectations for adequate and timely relief remains a challenge. The key for successful pain management lies to further education of medical stuff.

Key words: : Musculoskeletal pain, emergency department, analgesia, oligoanalgesia, acute pain, pain management.

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INTRODUCTION

Acute Pain is a frequent sypmtom among patients who seek urgent care; for many patients, pain is the main reason for visiting the Emergency Department (ED). The prevelance of acute pain in the ED has been widely recognized and recent literature support that 61-91% of patients admit to ED because they are in pain.[1] Musculoskeletal pain affects one out of three adults and it is the most common source of serious long term pain and physical disability.[2] Although pain has been recognized as a serious matter of public health, there is a gap between the increasing knowledge related to pain, the medical treatment and medicines efficient use.

The term of "oligoanalgesia" is used to describe the phenomenon of incomplete pain management at the ED owing to inadequate use of analgesics. Acute pain in the ED is undertreated worldwide, as it is shown from the high prevalence of acute pain and the small percentage of patients who received analgesia. Studies have shown that the frequency for analgesia for adults who received treatment for musculoskeletal pain is estimated between 11-29%.[3,4] Patients with acute musculoskeletal pain, who enter in the ED, usually get enlisted to a long rate in triage, leading to long waiting time. The pain they experience is frequently underestimated from the medical stuff, leading them not to get adequate analgesia. Moreover, nurses underestimate the pain intensity of musculoskeletal pain in 95% of the patients.[1]

Early and effective pain treatment is important in order to decrease the short-term and the long-term consequences of acute pain. Patients become more sensitive at painful stimulation, if their pain wasn't controlled for a long period of time. Timely treatment of mild and severe intensity pain should be a priority for proper patient management. Furthermore, adequate management of pain leads to early mobilization and reduced hospitalization. Inadequate pain management may lead to reduced productivity and reduced quality of patient's life.

There are few studies conducted in Greece which refer to musculoskeletal pain management. Although it is important to manage pain in ED, it is also recognized that there are barriers to effective pain relief in patients admitted to ED.

AIM

The aim of the present study was to explore the timely, effectiveness and adequacy of musculoskeletal pain management in the ED.

Material and Methods

A descriptive study was conducted in the Emergency Department of a General Hospital of Athens. The studied sample consisted of 82 patients who admited to hospital ED with acute musculoskeletal pain as main symptom. All patients met the following criteria: age >16 years old, ability to speak Greek language, Glascow scale ≥14, acute pain lasting less than six weeks. Patients with chronic pain, hemodynamic instability, mental illness, deafness and hearing loss or those received analgesics before reaching the ED were excluded from the study. A special designed registration form was used for the interview that also included a numerical rating scale pain assessment and a Faces Pain Rating Scale. The first part of the registration form included demographic features, anthropometric and clinical features, patients vital signs, diagnostic tests that performed during patient's stay in ED, pain characteristics, drug administration and time between patients arrival and analgesic adminitstration. The numerical rating pain scale assessed the pain that patient experienced. The scale is composed of 0 to 10, where 0 shows absence of pain, 1-3 low pain intensity, 4-6 mild pain intensity and 7-10 severe pain intensity. The facial pain scale also reveals the intensity of pain. Both scales have low risk of error, meet all the methods of reliability and can be used in parametric tests. [5-7]

ETHICS

Data collection was performed after a written permission from the hospital's scientific council. Informed consent was completed from all the participants of the survey. The participants were informed about the purpose of the study, the confidentiality of the data and the voluntary nature of their participation. During the present study, all ethical and ethical principles were respected.

STATISTICAL ANALYSIS

Continuous variables are presented as mean values (± standard deviation) and categorical variables as frequencies. Characteristics were compared by applying chi-square test for categorical variables and independent sample t-test for continuous variables. Data analysis was performed by using the Statistic Package for Social Sciences (SPSS) statistical packet ver.19.

RESULTS

The studied sample consisted of 82 patients that arrived in the ED with musculoskeletal pain as main complaint. Demographic characteristics are presented in Table 1. The majority of the patients were female (57.3%), married (60.5%), of Greek origin (91.5%) and their mean age was 53±20 years. The most common cause of arriving to the ED was pain of lower limb (45.1%), (Table 2). Among the applied diagnostic tests, the most common in use was x-ray (74.1%), ultra sound (25.9%) and computed tomography (11.1%), (Table 3).

Pharmaceutical treatment was given to the majority of the patients who admitted to the ED with acute musculoskeletal pain (51.2%). Non opioid analgesics were mainly preferred (29.3%) and gastroprotective agents were given in 30.5% of the patients, (Table 4).

Non-pharmaceutical analgesic interventions were used in 51.2% including immobilization (25.6%) and fracture shuffle (9.8%). (Table 5)

The average time to initial analgesia was 16.56±32.89 min and ED patient's length of stay was 80.86±46.44 min. The intensity of pain was measured at two time points; the first time point was during patients' admission to ED and the second one, 30 minutes post treatment or post ED discharge. According to patients, the mean pain intensity score varies from 7.25 (first time point) to 3.76 (second time point), (Table 6).

The location of the pain was reported to be upper and lower limbs (47.6%) and low back (22%). The pain was described as stable and continuous in 84.1% of the patients, (Table 7).

Patients who received medication had higher pain intensity at the first measurement and significantly reduced at the second one, (p-value 0,001) (Table 8).

Patients who received non-opioids analgesics and non-steroidal anti-inflammatory drugs (NSAIDs) had sufficient decrease of their pain compared to those who were treated with opioids or non-pharmaceutical analgesic interventions (p-value 0.00- 0.04) (Tables 9-12).

DISCUSSION

The present study investigated the administration of both pharmaceutical and non-pharmaceutical analgesic treatment in patients who arrived in the ED of a public hospital, mainly due to acute musculoskeletal pain. Patients who visited the orthopedic physician received pharmaceutical analgesia in 51.2% and non-pharmaceutical analgesic medication in 51.2%. The mean intensity of the pain at the first measurement with NRS, was 7.95±1.11 and at the second time point 2.83±2.51, thirty minutes post analgetics or at the time of discharge, if no analgesia was provided. Even at the second measurement of the pain intensity, it was found to have a mean pain intensity 2.57 ±2.24 if analgesia was provided and 2.83 ±2.51 if not, indicating that the pain remained in al low or mild level.

Pierik et al.,[1] showed that the patients included in their study reported high intensity of pain both at arrival and discharge from ED. The mean intensity changed from 6.50 to 5.64 at discharge time point. The percentage that received medication was 35.7% but 14.3% refused to take medication provided from health professionals. A total of 12.5% received sufficient analgesia. Non-pharmaceutical analgesic interventions were applied in 78.9% of the patients.[1]

In a similar study of Stainikowitz et al.,[8] related to under treatment of acute musculoskeletal pain, 70% of the patients had received analgesia in a mean time of 80±68 min. Following educational intervention, introducing VAS in the patient chart and establishing a protocol for the management of pain, with clear guidelines for nursing staff, the administration of analgesia raise to 82% and mean time was significantly reduced to 58±37 min.

Another study of Goodacre & Roden,[9] in an orthopedic ED, shows that administration of analgesia was significantly improved, after introducing protocols of analgesia. Unsatisfactory analgesia in fractures reduced from 91% to 69% and in the

other orthopedic cases, from 39% to 22%. Also, IV opioid administration was increased from 9% to 37%. Although, many patients remained untreated or undertreated.

The study of Butti et al.,[10] in order to explore the effectiveness and efficiency of the timely implementation of the Pain Management Protocol by triage, showed that 84.8% of patients received analgesia during the triage, while in 97.4% of the cases received paracetamol 1000mg. Opioids were given in 2.5%. The mean time of medicine administration was 5.9 min and 60 min later, reassessing the pain, there has been a reduction of at least two degrees in 65.9%. Revaluating at the exit, 33.2%% of patients had a reduction in pain intensity >50%, while mean decrease was 39%.

In contrast, in the study of Patrick et al.,[11] the proportions of patients with severe pain who received analgesia within 30 min, the mean time of administration and the mean time of pain relief were compared, six months earlier and six months after the implementation of the new pain management policy, surprisingly, the mean waiting time for analgesic delivery increased from 64 to 80 min and the proportion of patients who received analgesia within 30 min decreased from 17% to 7%. The mean time to relieve severe pain wasn't significantly different (130.5 vs 153 min). They justified this increase in greater patient attendance, the priority of non-hemodynamically stable cases, staff shortage and problematic pain assessment, as some patients were unable to quantify their pain, some patients reported it elevated in order to advance and some of them have hidden the pain, raising doubts about the urgency of the administration of analgesia.

In the present study, the mean time from pain to initial analgesia was 17.37±39.21 min. This cannot be considered to be in line with the international guidelines for the management of pain as it was measured by the patient's approach to the doctor and not by his arrival in the Emergency Department. The lack of measurement and record of the pain during the triage and the absence of analgesia protocols had an inhibitory effect. The aim of Jennings et al.,[12] study was to estimate the average duration to analgesia in patients that were administered by nursing specialists to the ED. This is a rapidly developing model in Australia, but there has been insufficient assessment of their participation in quality of care provision in the patient.

Similar studies emphasize that when nursing staff undertook the granting of analgesics, based on protocols, resulted in a remarkable reduction in mean time to first analgesia at 26 minutes and reduction in pain intensity.[13, 14] The study of Jennings et al.,[12] reports mean time to the assessment of 33.5 minutes, with 45.3% of patients being evaluated within 30 minutes of their approach. The mean time to analgesia was 60.5 min and 26.6% of patients received analgesia within 30 min of admission.

Another study of Fry et al.,[15] in many Emergency Departments in Australia, in a sample of 2.166 patients, showed that 95% of patients reached the hospital using an ambulance. Analgesia had been given to patients by paramedics and it consisted of morphine (14.2%), morphine products and methoxyflurane (29.3%). They had already registered the intensity of pain using the VAS and non-pharmaceutical analgesic interventions had been provided. Of all patients who suffered from pain, 74.9% received analgesia. Opioids were administered at 32.7%. The mean time of administration was 70 min. In Australia, in 69.4% of Emergency Departments policies are in place to allow nursing staff to provide analgesia, without medical prescription, including opioids, nitrite, NSAIDs and paracetamol. Also, regular training is provided to staff to manage the pain.

In this study, analgesia provided consisted of 9.8% opioids, 25.5% NSAIDs, 29.3% non-opioids analgesics and 2.4% anxiolytics. Opioid administration reduced the pain by 50% from the first to the second measurement. Opioid administration was low and is inconsistent with international guidelines recommending opioids as the most appropriate for the management of severe pain. Most patients, with acute pain, can receive opioids without a major risk of respiratory depression. However, health professionals are taught to fear undesirable opioid effects, especially respiratory depression. The possibility of respiratory depression is very small if proper titration of the dose is made.[16] The study of Bounes V et al.,[17] in patients receiving opioids in a prehospital setting, supports the safety of opioids, as none of them showed respiratory insufficiency or needed an opioids antagonist.

NSAIDs have elevated risk of bleeding, kidney and cardiac complications, and myocardial infarction. Also, they have a ceiling dose above which there is no additional therapeutic effect. NSAIDs are treatment of choice for mild musculoskeletal pain and the recent guidelines recommend giving the lowest dose for the shortest time due to their side effects.[18, 19]

In this study there was no statistically significant association between sex and medication, as opposed to the review of Rupp T & Delaney K., where more analgesic was given in women after they reported greater pain.[20]

Many studies have shown that the application of protocols to the management of pain has resulted in a reduction in the onset of analgesia and an increase in the number of patients receiving analgesia.[9,21] However, the general guidelines issued for the management of pain are not adopted by all hospitals, but they simply provide a framework around which they can be approached for the pain. Thus, improving the management of pain in emergency cases is a slow process.[22]

The main limitations of the present study were the small size of the studied sample and the fact that was conducted in one hospital, factors that do not help to draw safe conclusions and generalize the results. Also, it was not possible to accurately measure the time of administration of analgesia, since the patient's registration was initiated upon entering the orthopedic and the waiting time was unknown.

CONCLUSIONS

Pain is the most common reason for patients to seek medical attention and yet they are still undergoing treatment. Despite extensive research and the issue of international guidelines for the management of pain, satisfying patient expectations for adequate and immediate relief remains a challenge for most emergency departments. It is necessary to make efforts to improve pain management by creating triage system in all Emergency Departments, adopting guidelines for pain management and improving documentation of pain.

Further researches would be helpful so as to identify factors that may lead to oligoanalgesia and find solutions in order to provide timely and adequate analgesia.

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ANNEX

TABLE 1. Distribution of the sample of the study by gender, age, family and financial status, level of education, nationality and health insurance.

Variables	Mean (±S.D.)*	% (n/N)
Gender		
Male		42.7 (35/82)
Female		57.3 (47/82)
Marital Status		
Married		60.5 (49/82)
Single		23.5 (19/82)
Divorced		1.2 (1/82)
Widowed		114.6(12/82)
Financial Status		
Bad (<8.000)		81.8 (63/82)
Average (8.000 – 10000)		18.2 (14/82)
Level of education		
Illiberal		9.8 (8/82)
Primary School		17.1 (14/82)
Junior High School		20.7 (17/82)
High School		30.5 (25/82)
Higher Education		20.7 (17/82)
MSc/PhD		1.2 (1/82)
Nationality		
Greek		91.5 (75/82)
Other		8.5 (7/82)
Insurance		
Yes		91.5 (75/82)
No		8.5 (7/82)
Kind of insurance		
Public insurance		91.5 (75/82)
Private Insurance		2.4 (2/82)
Age (years)	53.01 (±20.36)	
***S.D. Standard Deviation**		

TABLE 2: Reasons for ED approach.

Variables	% (n/N)
Upper limp Pain	98.5 (194/197)
Neck pain	1.0 (2/197)
Low limp pain	
Low back pain	
Chest pain	

TABLE 3: Radiological and laboratory tests of patients admitting to the Emergency Department with acute musculoskeletal pain.

Variables	% (n/N)
Electrocardiogram (ECG)	
Yes	9.9 (8/82)
No	90.1 (73/82)
X-Ray	
Yes	74.1 (60/82)
No	24.7 (20/82)
Ultrasound	
Yes	25.9 (21/82)
No	74.1 (60/82)
CT	
Yes	11.1 (9/82)
No	88.9 (72/82)
MRI	
Yes	1.2 (1/82)
No	98.8 (80/82)
General blood test	
Yes	16.4 (12/82)
No	83.6 (61/82)

TABLE 4: Pharmaceutical treatment.

Variables	% (n/N)
Drug administration	
Yes	51.2 (42/82)
No	48.8 (40/82)
Gastro protection	
Yes	30.5 (25/82)
No	69.5 (57/82)
Opioids	
Yes	9.8 (8/82)
No	90.2 (74/82)
Non-Steroidal Analgesics (NSAIDs)	
Yes	25.8 (21/82)
No	74.4 (61/82)
Non opioid analgesics/antipyretics	
Yes	29.3 (24/82)
No	70.7 (58/82)

TABLE 5: Non-pharmaceutical treatment.

Variables	% (n/N)
Yes	51.2 (42/82)
No	48.8 (40/82)
Fracture shuffle	
Yes	9.8 (8/82)
No	90.2 (74/82)
Fracture Immobilization	
Yes	25.6 (21/82)
No	74.4 (61/82)

TABLE 6: Duration of pain (in minutes) and intensity at the 1st and 2nd time-point.

Variables	Mean ± S.D.*
Time of delivery of analgesia after arriving at the Emergency Department (min)	16.56 ± 32.89
Duration (min)	
1st time point	7.25 ± 1.85
2nd time point	3.76 ± 2.66
***S.D Standard Deviation**	

TABLE 7: Character and location of pain.

Variables	**% (n/N)**
Character of pain	
Stable and continuous	84.1 (69/82)
Intermittent	15.9 (13/82)
Location Of Pain	
Upper and lower limbs	47.6 (39/82)
Chest	8.5 (7/82)
Abdomen	14.6 (12/82)
External genital organs / Rectum	1.2 (1/82)
Low back	22.0 (18/82)
Head / Neck	4.9 (4/82)
Multiple location	1.2 (1/82)

TABLE 8: Correlation of medication with pain duration, measurement of intensity at first and second measurement, systolic and diastolic blood pressure and pulse.

	Patients who received medications Mean ± S.D.*	**Patients who did not received medications Mean ± S.D.***	**p-value**
Duration of pain (min)	17.37 ± 39.21	15.7 ± 24.8	0.82
Pain 1st time point	7.95 ± 1.12	6.51 ± 2.18	**0.001**
Pain 2nd time point	2.57 ± 2.24	2.83 ± 2.51	**0.00**
Systolic blood pressure	133.17 ± 17.34	129.87 ± 17.07	0.39
Diastolic blood pressure	97.12 ± 2.22	97.88 ± 0.99	0.52
Pulse	78.49 ± 10.86	79.95 ± 12.18	0.57
***S.D. Standard Deviation**			

TABLE 9: Correlation of opioids with pain duration, measurement of intensity at first and second measurement, systolic and diastolic blood pressure and pulse.

	Patients who received medications Mean ± S.D.*	**Patients who did not received medications Mean ± S.D.***	**p-value**
Duration of pain (min)	69.8 ± 68.6	10.72± 19.86	**0.04**
Pain 1st time point	8.75 ± 1.48	7.09 ± 1.82	**0.01**
Pain 2nd time point	4.50 ± 1.85	3.68 ± 2.70	0.40
Systolic blood pressure	141.25 ± 21.00	130.49 ± 16.53	0.09
Diastolic blood pressure	81.88± 9.61	75.07 ± 8.78	**0.04**
pulse	82.25 ± 14.97	78.88 ± 11.11	0.43
***S.D. Standard Deviation**			

TABLE 10: Correlation of non-steroid analgesics with pain duration, measurement of intensity at first and second measurement, systolic and diastolic blood pressure and pulse.

	Patients who received medications Mean ± S.D.*	**Patients who did not received medications Mean ± S.D.***	**p-value**
Duration of pain (min)	6.10 ± 11.12	20.23 ± 37.05	**0.01**
Pain 1st time point	7.76 ± 0.76	7.08 ± 2.08	**0.03**
Pain 2nd time point	1.62 ± 1.98	4.49 ± 2.46	**0.00**
Systolic blood pressure	132.75 ± 19.36	131.17 ± 16.55	0.72
Diastolic blood pressure	76.75 ± 8.15	75.42 ± 9.35	0.57
Pulse	79.70 ± 10.95	79.05 ± 11.73	0.82
***S.D. Standard Deviation**			

TABLE 11: Correlation of non-opioids analgesics / antipyretics with pain duration, measurement of intensity at first and second measurement, systolic and diastolic blood pressure and pulse.

	Patients who received medications Mean ± S.D.*	**Patients who did not received medications Mean ± S.D.***	**p-value**
Duration of pain (min)	18.85 ± 39.49	15.60 ± 30.03	0.68
Pain 1st time point	8.16 ± 1.06	6.87 ± 1.98	**0.00**
Pain 2nd time point	2.83 ± 2.51	4.14 ± 2.64	**0.04**
Systolic blood pressure	135.42 ± 18.70	129.91 ± 16.39	0.19
Diastolic blood pressure	97.08 ± 22.33	97.66 ± 1.45	0.18
Pulse	79.46 ± 13.59	79.11 ± 10.60	0.90
***S.D. Standard Deviation**			

TABLE 12: Correlation of non-pharmaceutical analgesic interventions with pain duration, measurement of intensity at first and second measurement, systolic and diastolic blood pressure and pulse.

	Patients who received medications Mean ± S.D.*	**Patients who did not received medications Mean ± S.D.***	**p-value**
Duration of pain (min)	7.25 ± 11.18	17.05 ± 33.60	0.56
Pain 1st time point	7.50 ± 1.73	7.24 ± 1.87	0.79
Pain 2nd time point	4.25 ± 2.06	3.73 ± 2.69	0.70
Systolic blood pressure	132.50 ± 11.90	131.51 ± 17.47	0.91
Diastolic blood pressure	98.25 ± 0.95	97.45 ± 1.79	0.37
Pulse	75.75 ± 8.50	79.39 ± 77.63	0.54
***S.D. Standard Deviation**			