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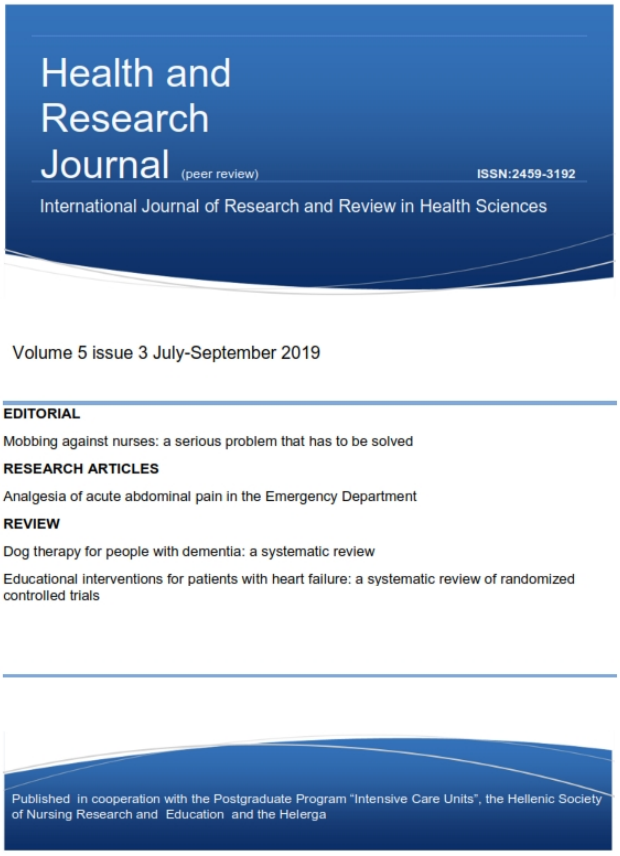

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RESEARCH ARTICLE

ANALGESIA OF ACUTE ABDOMINAL PAIN IN THE EMERGENCY DEPARTMENT

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Abstract

Introduction: Pain accounts for 40% of all patients admitted to the Emergency Department (ED). The most common cause of pain is abdominal pain, which accounts for 8%. In contrast to the international guidelines, pain is under-treated making the phenomenon of oligoanalgesia apparent.

Aim: The purpose of this study was to explore the incidence of analgesia in patients admitted to the ED suffering from acute abdominal pain.

Material and Method: This is a descriptive cross-sectional study. The studied sample consisted of 197 patients, who admitted to the ED of a General Hospital of Athens, Greece with reported symptom: acute abdominal pain. For data collection, a special designed form of closed-type questionnaires was used. Data analysis was performed by using the Statistic Package for Social Sciences (SPSS) statistical packet ver.19.

Results: Out of the total number of patients admitted to ED with reported abdominal pain, 74.6% received analgesia and the mean time of analgesia administration during ED admission was 46.43 minutes. The mean pain intensity at the first time point measurement was 7.16 and at the second one was 4.04, according to pain recording scale (0-10 scale). Non-opioid anti-inflammatories (52.3%), non-steroidal analgesics (22.8%) and opioids (9.1%) were mainly administered patients during their ED stay

Conclusions: Despite the published international guidelines which refer to analgesia time and type, pain and especially abdominal pain, is under-treated. The key to tackling oligoanalgesia is to educate health professionals.

Key words: : Pain, acute abdominal pain, emergency department, oligoanalgesia.

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INTRODUCTION

Pain is defined as the "more or less, localized sense of discomfort due to the stimulation of specific nerve endings". [1] According to the International Association for the Study of Pain (IASP), pain is defined as the unpleasant aesthetic and emotional experience associated with actual or potential tissue injury or described as such. [2,3] Pain accounts for 40% of all patients admitted to the Emergency Department (ED) and is associated with an emergency situation involving trauma, burn, infection or inflammatory disease. [4] Abdominal pain, in particular, is the most common symptom of patients in the ED and accounts for 8% of all. [5]

Patient with acute abdominal pain is a challenge for the healthcare professionals in the ED, since they called upon to relieve patients' pain before diagnoses is reached.. [6] Despite research suggesting that early analgesia in patients with undiagnosed acute abdominal pain does not seem to affect the correct diagnosis, it seems that health professionals delay the patient's relief, fearing that the clinical diagnosis will be altered. [1,6] Non-existent or even inadequate analgesia, also known as oligoanalgesia, can adversely affect the quality of care and patient satisfaction. [4,7,8,9,10] In addition, due to the insufficient treatment of pain in the ED, there is an increased social and economic impact with the re admissions to the ED as patients try to find a solution to their problem. [11,12,13] The phenomenon of oligoanalgesia has been observed in many studies conducted the last 30 years; showing the need for taking care bundles so as to effectively treat acute pain in the ED. Finding a solution to this problem will promotes advanced quality of care and enhance patients satisfaction. [7]

AIM

The aim of the present study was to explore the incidence of analgesia in patients admitted to ED with reported acute abdominal pain. Moreover, the present study assesses the degree of relief of acute abdominal pain in patients treated with analgetics compared to those who received no analgesia.

Material and Methods

This is a descriptive cross-sectional study. The studied sample consisted of 197 patients, who admitted to the ED of a General Hospital of Athens, Greece with reported acute abdominal pain. Data collection and analysis took place between May 2016 and May 2018. For data collection, a special designed form of closed-type questionnaires was used, which consisted of two parts. The first part included questions related to: demographic characteristics (gender, age, marital status, educational level, nationality, health insurance institution and time of approach and discharge from Emergency Department), anthropometric and clinical characteristics (height, body weight, body mass index, medical history), patient's vital signs when admitted to the ED, diagnostic examinations performed during patient's ED stay, laboratory findings, pain characteristics (localization, character, duration), drug administration and what kind of drugs, and patients' outcome. The second part included two pain recording scales. The first was a verbal numerical rating scale with scores ranging from 0 to 10, where 0 is the absence of pain, 1-3 is low pain intensity, 4-6 is mild pain and 7-10 is strong pain intensity. The second one was a Faces Pain Scale, which revealed the intensity of the pain. Both were completed during patients' admission to ED and patients discharge.

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 demographic characteristics of the patients are presented in Table 1. Ninty eight of the 197 patients were male (49.7%) and 99 were female (50.3%), with an average age of 53 years (52.82 ± 17.41). Concerning the composition of the sample in terms of marital status, the majority of the patients were married (68.0%), followed by the unmarried (17.3%), the widowed (10.7%) and finally the divorced (3.6%). Most of the patients were high school graduates (36.5%) and higher education graduates (29.4%), followed by lower secondary school leavers (14.7%), secondary school (12.2%) and illiterate (6.6%). As far as the economic status is concerned, there is a higher percentage of those in an average state (29.4%), followed by poor (25.9%), good (21.8%) and very good (2.0%). The majority of patients was of Greek origin (89.8%) and had health insurance (92.9%), with its highest percentage being public insurance (89.3%).

The main reason of the total number of admissions to the ED with reported acute abdominal pain is acute pathology (98.5%) and only 1% is the result of a trauma or an accident. (Table 2)

X-ray (79.2%) and ultrasound (79.7%), in terms of imaging tests, were sufficient to diagnose the cause of abdominal pain, since they exhibited the highest percentages relative to the CT scan (13.2%) and MRI scan (1.0%). An electrocardiogram was also performed (37.6%) and general blood test (53.8%) and urine test (37.1%) were performed in order to diagnose the cause of acute abdominal pain. (Table 3)

Pharmaceutical treatment was granted to the largest percentage of people admitted to the ED with reported abdominal pain (74.6%). The use of non-opioid analgesics/antipyretics (52.3%) and non-steroidal analgesics (22.8%) was mainly preferred followed by opioids (9.1%). Gastroprotection was administered at 38.4%. (Table 4)

The average time to administer analgesia after arrival at the ED was 46.43 min. The duration of the pain was recorded in the ED. Furthermore, pain intensity was measured both at the patient's admission to the Emergency Department and after analgesia was administered. The average pain duration was about one hour (61.97 minutes). At the first measurement the pain intensity was averaged at 7.16 with a noticeable improvement in the second measurement, as the mean intensity dropped to 4.04. (Table 5)

Although, the largest percentage of the described pain (69.5%) is located in the abdomen, there have been cases where the pain was located at a different site, such as the lumbar (18.3%), thoracic (3.6%) or upper and lower limbs (6.1%). Most of the pain was stable and continuous (74.1%), while intermittent pain was 25.9%. (Table 6)

As far as the relation between gender and the administration of medication and its type, in both genders, administration of non-opioid analgesics / antipyretics was preferred, followed by non-steroidal anti-inflammatory drugs and, finally, opioids in a very small percentage. There is no difference in the type of analgesia between the two sexes, except in opioids where the proportion of males to whom they are administered is almost three times more than that administered to females (p-value 0, 04). (Table 7)

The duration of pain among those given analgesia in relation to those not given is far less (p-value 0,043). In both groups the pain intensity is lower at the second measurement, albeit at a lower rate. The vital signs show no differences between the two groups. (Table 8)

Opioids have a faster effect and greatly reduce the duration of pain compared to non-steroidal anti-inflammatory and non-opioid analgesics / antipyretics. There is no difference in pain intensity between the first and the second measurement, regardless the type of analgesia. Finally, both opioids and non-steroidal analgesics do not appear to affect patients' vital signs. (Tables 9, 10, 11)

DISCUSSION

This study explored the administration of analgesia and analgesics administration time in patients admitted to a Tertiary Public Hospital of Athens with reported acute abdominal pain. According to the guidelines for its treatment, Mayumi T et al., [14] in 2015, abdominal pain is the main symptom of 5% of all patients coming to the Emergency Department. Bearing in mind both the mechanism and the clinical pathophysiology of abdominal pain, it is considered necessary to prevent the deterioration of patient's clinical condition by performing direct and adequate treatment.[15]

According to the study, 74.6% of the total number of patients

received analgesia. This finding seems to contradict the phenomenon of oligoanalgesia that has been observed and analyzed in many studies, such as the one from Rupp and Delaney, [7] according to which, the problem of oligoanalgesia is global. The occurrence of this problem derives from the fact that pain is not correctly assessed because it is subjective, despite its objective definition. Pain is experienced differently and in varying intensity by each individual and it is difficult to be appreciated correctly by another person. In addition, there is insufficient knowledge of the effectiveness of analgesia as well as the way, time and dosage that can be administered. According to the same research, other causes of pain undertreatment are opiophobia, as well as the cultural, social, racial and genetic differences observed among the patients in the ED.

In this research, the mean time of administration of analgesia in patients with reported acute abdominal pain was 46.43 minutes. This differs a lot from the time suggested by the international guidelines. According to the British Emergency Medical College, analgesia should be given within the first 20 minutes of the patient's entry into the ED. [16,17] In a study by Sokoloff et al., [18] patients expect analgesia within the first 25-30 minutes after their arrival at the Emergency Department, which is also suggested by the Canadian Emergency Department Triage and Acuity Scale. According to a number of surveys, achieving this goal is far from the reality and was first identified as a problem by Wilson and Pendleton [1] in the 1980s when the definition of oligoanalgesia was used for the first time. [10,19,20]

As far as the imaging test used, in order to investigate the cause of the abdominal pain, the results of this study, seem to agree with the ones of the research by Vellisaris et al. [21] The most frequent imaging tests were x-ray scan followed by ultrasound, CT scan and MRI scan, although, according to Mayumi et al, [14] CT scan shows greater sensitivity and accuracy in the diagnosis of abdominal pain than simple x-ray scan and is suggested along with ultrasound.

In this study there are no differences in the medical history between the two genders, which do not seem to affect their clinical picture, since the majority of both genders are free of diseases. In addition, gender does not seem to affect the administration or not of analgesia. A small difference occurs only in opioid administration, where the proportion given to males is higher than that of females. In contrary, according to a research by Motov and Khan, [22] analgesia is affected by age and gender, since a greater amount of analgesia is required in women than men for the same pain.

Although the analgesics were administrated with delay and without following the international guidelines, they significantly affected the duration of pain. Most analgesics administrated, were non-opioid analgesics / antipyretics, followed by non-steroidal analgesics and opioids. Gastroprotection was also administered at an increased rate. The mean pain intensity at the time of patient arrival in the ED, according to the numerical scale used in this research, was 7.16; although can be characterized as a high-intensity pain, the type of analgesia differs from the international guidelines of the World Health Organization. According to these guidelines, for moderate pain (4-6) it is recommended to administer non-steroidal anti-inflammatory drugs and / or a mild opioid, while for severe pain (7-10), it is recommended to administer opioids in combination or not with non-steroidal anti-inflammatory or non-opioid analgesics. [17] Furthermore, Mayumi et al, [14] suggests that no matter what the cause of pain may be, early administration of analgesia is recommended before the final diagnosis. In addition, according to Zoltie & Cust, [23] the administration of analgesia affected the clinical condition of the patients but did not change the diagnosis.

As far as the administration of opioids is concerned, opiophobia, meaning the fear of side effects from opioid administration and their influence on the clinical condition and consequently differential diagnosis, may have contributed to their reduced use for the treatment of acute abdominal pain. In a study by Stephen et al., [24] on the administration of morphine, it was found that there was no influence on the diagnosis of the etiology of acute abdominal pain. Furthermore, according to Pace & Burke, [25] early morphine administration, did not affect the ability of physicians to correctly and accurately diagnose the cause of acute abdominal pain. There was no difference in diagnosis and differential diagnosis between those who treated with morphine and those who were not.

Significant diagnostic errors were the same in both study groups. Another reason for the existence of opiophobia, according to Graber et al., [26] is the fear that opioid use may affect the mental clarity of the patient, resulting in not being able to give his consent to any surgery that may be needed.

The use of non-steroidal analgesics ranged at low rates, despite the international guidelines. According to a survey by Nalamachu et al., [27] the use of non-steroidal analgesics is an important drug in the treatment of pain, but it is not widely preferred by health professionals in order to avoid comlications from gastrointestinal and cardiovascular system, such as stomach ulcer or increased blood pressure. In addition, acetaminophen may be associated with increased blood pressure; as Forman JP et al., [28] revealed in their study. They found that the use of acetaminophen more than six times a week can be associated with increased blood pressure in males. In contrast to the results of the present study, Pollack et al., [29] revealed that non-steroidal anti-inflammatory drugs are among the most common analgesic medications used and are very effective in pain caused by inflammation, or musculoskeletal pain, kidney colic, gynecological ailment pain and pain of cancer. Administration of non-steroidal anti-inflammatory (ketorolac) was effective in patients with musculoskeletal or visceral pain, who did not admitted to hospital. In particularly, increased patient's satisfaction and reduced adverse effects were observed.

In this study, despite the increased rate of analgesia, the reduced use of both non-steroidal anti-inflammatory drugs and opioids combined with delayed administration, made clear that treatment of acute abdominal pain in the ED is not immediate, making apparent the phenomenon of oligoanalgesia. According to a study by Zimmerman and Halpern, [30] on analgesia of abdominal pain, the decision to administrate or not analgesia depends on the education, experience and specialty of the physician.

The pain intensity seemed to be reduced in the second time point. A possible explanation for this finding is the phsychological support from health care professionals who try to comfort patients who experience fear and anxiety related to their health outcome.

The main limitations of this research were the small sample size and the fact that data derived from a single hospital.

CONCLUSIONS

In conclusion, patients admitted to ED do not receive adequate analgesics and moreover administration time was not according to guidelines. The results of this research reveal the need for care bundles for pain relief in ED. Specifically:

1) Well structured educational programs for health professionals aiming at early identification and management of acute abdominal pain.

2) Development of checklist for international guideline implementation in clinical practice.

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ANNEX

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

Variables	Mean (±S.D.)*	% (n/N)
Gender		
Male		49,7 (98/197)
Female		50,3 (99/197)
Marital Status		
Married		68,0 (134/197)
Single		17,3 (34/197)
Divorced		3,6 (7/197)
Widowed		10,7 (21/197)
Financial Status (Monthly income in euro)		
Bad (<8.000)		25,9 (51/197)
Average (8.000 – 10000)		29,4 (58/197)
Good (10.000 – 20.000)		21,8 (43/197)
Very Good (>20.000)		2,0 (4/197)
Level of education		
Illiberal		6,6 (13/197)
Primary School		14,7 (29/197)
Junior High School		12,2 (24/197)
High School		36,5 (72/197)
Higher Education		29,4 (158/197)
MSc/PhD		0,5 (1/197)
Nationality		
Greek		89,8 (177/197)
Other		10,2 (20/197)
Health Insurance		
Yes		92,9 (183/197)
No		7,1 (14/197)
Type of insurance		
Public insurance		89,3 (176/197)
Private Insurance		4,6 (9/197)
Age (years)	52,82 (±17,41)	
***S.D. Standard Deviation**		

TABLE 2: Possible diagnosis – Causes of acute abdominal pain

Variables	**% (n/N)**
Acute pathology	98,5 (194/197)
Trauma / Accident	1,0 (2/197)

TABLE 3: Radiological and laboratory tests of patients admitting to the ED with acute abdominal pain.

Variables	**% (n/N)**
Electrocardiogram (ECG)	
Yes	37,6 (74/197)
No	58,4 (115/197)
X-Ray	
Yes	79,2 (156/197)
No	19,8 (39/197)
Ultrasound	
Yes	79,7 (157/197)
No	19,3 (38/197)
CT	
Yes	13,2 (26/197)
No	82,7 (163/197)
MRI	
Yes	1,0 (2/197)
No	94,4 (186/197)
General blood test	
Yes	53,8 (106/197)
No	28,9 (57/197)
Urine test	
Yes	37,1 (73/197)
No	12,2 (24/197)

TABLE 4: Pharmaceutical treatment

Variables	% (n/N)
Drug administration	
Yes	74,6 (147/197)
No	25,4 (50/197)
Gastroprotection	
Yes	38,6 (76/197)
No	61,4 (121/197)
Opioids	
Yes	9,1 (18/197)
No	90.9 (179/197)
Non Steroidal Analgesics (NSAIDs)	
Yes	22,8 (45/197)
No	77,2 (152/197)
Non opioid analgesics/antipyretics	
Yes	52,3 (103/197)
No	47,7 (94/197)

TABLE 5: Duration of pain in minutes and intensity at the 1st and 2nd time-point

Variables	Mean ± S.D.*
Time to analgesia from the time of the arrival at the ED (min)	46,43 ± 124,25
Duration (min)	61,97 ± 253,45
1st time-point	7,16 ± 1,82
2nd time-point	4,04 ± 2,40
***S.D Standard Deviation**	

TABLE 6: Character and location of pain

Variables	% (n/N)
Character of pain	
Stable and continuous	74,1 (146/197)
Intermittent	25,9 (51/197)
Location Of Pain	
Abdomen	69,5 (137/197)
Chest	3,6 (7/197)
Waist	18,3 (36/197)
External genital organs / Rectum	1,0 (2/197)
Hands and feet	6,1 (12/197)
Head / Neck	1,0 (2/197)
Multiple location	0,5 (1/197)

TABLE 7. Correlations between gender and medications

	Drug administration		
Gender	**Yes %**	**No %**	**p**
Female	71,7	28,3	0,34
Male	77,6	22,4	
	Gastroprotection		
Gender	**Yes %**	**No %**	**p**
Female	42,4	57,6	0,26
Male	34,7	65,3	
	Opioids		
Gender	**Yes %**	**No %**	**p**
Female	5,1	94,9	**0,04**
Male	13,3	86,7	
	Non Steroidal Analgesics		
Gender	**Yes %**	**No %**	**p**
Female	21,2	78,8	
Male	24,5	75,5	0,58
	Non opioids Analgesics / Antipyretics		
Gender	**Yes %**	**No %**	**p**
Female	51,5	48,5	0,82
Male	53,1	46,9	

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

	Received medication Mean ± S.D.*	**Did not received medication Mean ± S.D.***	**p-value**
Duration of pain (min)	27,32 ± 128,8	167,46 ± 444,8	**0,043**
Pain 1st count	7,43 ± 1,76	6,33 ± 1,79	0,51
Pain 2nd count	3,93 ± 2,38	4,40 ± 2,46	0,24
Systolic blood pressure	128,11 ± 20,15	131,49 ± 13,12	0,19
Diastolic blood pressure	97,07 ± 1,91	96,89 ± 1,8	0,57
Pulse	77,40 ± 11,99	77,47 ± 8,22	0,97
***S.D. Standard Deviation**			

TABLE 9: Correlation of non steroidal analgesics with pain duration, measurement of intensity at first and second time-point, systolic and diastolic blood pressure and pulse

	Received medication Mean ± S.D.*	**Did not received medication Mean ± S.D.***	**p-value**
Duration of pain (min)	16,77 ± 55,79	75,53 ± 286,23	0,23
Pain 1st count	7,56 ± 1,57	7,04 ± 1,88	0,09
Pain 2nd count	3,78 ± 2,67	3,12 ± 2,32	0,40
Systolic blood pressure	132,53 ± 22,78	127,8 ± 17,09	0,20
Diastolic blood pressure	81,56 ± 18,85	78,11 ± 17,61	0,26
Pulse	76,44 ± 8,33	77,72 ± 11,90	0,51
***S.D. Standard Deviation**			

TABLE 10: Correlation of opioids with pain duration, measurement of intensity at first and second time-point, systolic and diastolic blood pressure and pulse

	Received medication Mean ± S.D.*	**Did not received medication Mean ± S.D.***	**p-value**
Duration of pain (min)	5,41 ± 5,71	67,82 ± 265,56	0,33
Pain 1st count	8,39 ± 1,2	7,03 ± 1,84	**0.00**
Pain 2nd count	4,5 ± 2,91	3,99 ± 2,35	0,24
Systolic blood pressure	133,53 ± 15,78	128,5 ± 18,9	0,29
Diastolic blood pressure	97,47 ± 1,12	96,98 ± 1,94	0,31
Pulse	75,18 ± 5,22	77,65 ± 11,57	0,38
***S.D. Standard Deviation**			

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

	Received medication Mean ± S.D.*	**Did not received medication Mean ± S.D.***	**p-value**
Duration of pain (min)	19,62 ± 48,93	110,29 ± 362,28	0,025
Pain 1st count	7,3 ± 12,81	7,0 ± 1,84	0,51
Pain 2nd count	3,86 ± 2,22	4,24 ± 2,59	0,27
Systolic blood pressure	127,71 ± 20,48	130,27 ± 16,55	0,34
Diastolic blood pressure	79,15 ± 21,45	78,74 ± 13,42	0,87
Pulse	78,67 ± 13,09	76,06 ± 8,43	0,11
***S.D. Standard Deviation**			