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Original Research

Use of Controlled Medications in the Emergency Department: Narcotics and Psychotropics

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ABSTRACT

Objective: Although the trends and outcomes of controlled medications prescribed by emergency physicians especially opioids are well-defined in the literature, there is insufficient evidence regarding their parenteral use during emergency department (ED) visits. Thus, we aimed to determine the prevalence use of these drugs and the conditions under which they are ordered.

Methods: We conducted a retrospective study from January to June 2018 at a secondary care ED in Turkey. Narcotics and psychotropics, were administered parenterally (intravenous or intramuscular) during patients' ED visits. We obtained the following data from the registry and hospital records: time of use, age, sex, diagnosis, drug (active ingredient), and type of physician (general practitioner or attending).

Results: During the six-month study period, parenteral controlled medication was used in 1111 ED visits (1% of all ED visits). Tramadol and pethidine were the most commonly used narcotic drugs in the ED. They were often used for musculoskeletal pain (29.1% and 47.1%, respectively) and abdominal pain (22.5% and 18.6%, respectively). ED revisits of patients who took these drugs were related to cancer pain. Meanwhile, diazepam and biperiden were the predominantly used psychotropics. Anxiety/agitation was diagnosed in 69.1% of patients who received diazepam and acute exacerbation of psychiatric diseases in 70.6% of patients who received biperiden. However, revisits of these patients to the ED were related to acute exacerbation of psychiatric diseases.

Conclusion: The rate of controlled medication use in the studied hospital is much lower than that in developed countries. This finding can be attributed to different factors, such as physician attitude, patient demands, and possibly cultural differences. Finally, revisits of these patients to the ED were mostly related to acute exacerbation of chronic diseases.

Keywords: Benzodiazepine, emergency department, narcotic, opioid, psychotropic

INTRODUCTION

Narcotic drugs (opioids) can stop severe pain without loss of consciousness. Many narcotics are controlled, as they cause respiratory depression and have dangerous side effects (physical and psychological dependence). Psychotropic drugs, which have a stimulating effect on the central nervous system, and are used in the treatment of behavioral and psychiatric disorders by changing consciousness and emotions. Both drug groups are used in a controlled manner because they have addictive effects when used over long periods (1).

International conventions have been established to prevent the illegal use of these drugs. Turkey is a party to the 1961 United Nations Single Convention on Narcotic Drugs, the 1971 United Nations Convention on Psychotropic Substances, and the 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (2-5). Prescribing controlled medications (especially narcotic drugs) is well-documented in research in western countries. According to the literature, opioid prescription rate is over 30% in EDs in the United States (US) (6). Studies also show that concern has been raised in developed countries (7). In Turkey, there are a few works regarding controlled prescriptions, and are not related to EDs (8, 9). In addition, parenteral use of these medications in EDs is unclear both in our country and in the literature.

In this study, we aimed at determining the prevalence of controlled medication use by patients in a secondary care ED in Turkey. We also identified the diagnoses and reasons for revisits of these patients.

METHODS

Study Design

We conducted a retrospective study from January to June 2018 in a secondary care ED in Turkey. This clinic is the largest and most crowded unit in its city. During the study period, the ED was visited 108,740 times. Ethics committee approval was received

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for this study from the ethics committee of the Nevşehir Hacı Bektaş Veli University (10.09.2018 – No:2018.10.119).

Study setting and population

In Turkey, controlled drugs are prescribed for outpatients by attending physicians, and for inpatients by all hospital physicians. Narcotic drugs classified by The Ministry of Health include methylphenidate and opioid derivations such as fentanyl, pethidine, hydromorphone, morphine, and codeine. Psychotropic medications include barbiturates and benzodiazepines such as alprazolam, lorazepam, diazepam, and midazolam. Tramadol, which is not a controlled drug in international settings, is under national control in Turkey. Biperiden is also under national control as a psychotropic drug, although it is an anticholinergic drug. Therefore, we included these drugs in this study.

In the hospital setting, narcotics and psychotropics are protected in pharmacies and sent to clinics in specific amounts by pharmacists when necessary. In EDs, these drugs are stored in locked cabinets for security. The responsibility of keeping records, counting, and returning of drugs belongs to the head nurse in the clinic. The drugs are used when ordered for patients by physicians. All these medications are administered parenterally (intravenous or intramuscular) in the ED.

We evaluated all ages in the study. We classified ED visits (where controlled drugs were administered) as single visits and revisits. Single visit means one patient had only one presentation to the ED, while revisit means one patient had more than one ED presentation. We obtained the following data from the registry and hospital records: time of use, gender, diagnosis, drug (active ingredient), and type of physician (general practitioner or attending). All controlled drugs are recorded in the registry when they are used. We included all records falling within the study period in the study.

Data Analysis

We performed statistical analyses using the Statistical Package for Social Sciences, IBM SPSS version 21.0 for Windows (IBM SPSS Corp.; Armonk, NY, USA). We presented continuous variables as median values and interquartile ranges. We described categorical variables as frequencies and percentages and compared using Pearson χ^2 or the Fisher exact test. A critical α value of 0.05 was accepted as statistically significant.

RESULTS

During the six-month study period, 1111 ED visits (1% of all ED visits) where any parenteral controlled medication was used were found. The median age was 43 years (IQR 31–59), and 51.9% of the patients were males. The rates of controlled drug use were 16.3% between 24:00 and 08:00 am, 37.2% between 08:00 and 16:00 hours, and 46.5% between 16:00 and 24:00 hours. Among these ED visits, 25.1% were revisits. These drugs were ordered by general practitioners in 62.2% of the patients and by attending emergency physicians in 37.8%. Two controlled medications were given in a single visit to 4.9% of the patients, while only one of such medication was given in the same visit to 95.1% of the patients.

Main Points:

- During the study period, parenteral controlled medication was used in 1% of all secondary care ED visits.
- This rate was much lower than that in developed countries.
- Tramadol and pethidine were the most commonly used narcotic drugs.
- Diazepam and biperiden were the predominantly used psychotropics.

Narcotics

Tramadol was ordered in 481 ED visits. The most prevalent diagnoses were musculoskeletal pain (29.1%), abdominal pain (22.5%), and renal colic (17.3%). The rate of revisit was 26.8%. The rates of musculoskeletal pain and abdominal pain were higher in the single visits than in the revisits, while that of cancer pain was higher in the revisits (Table 1).

Pethidine was used in 70 visits. The most common diagnoses were musculoskeletal pain (47.1%), abdominal pain (18.6%), and cancer pain (12.9%). The rate of revisit was 24.3%. The rate of musculoskeletal pain was higher in the single visits, while that of cancer pain was higher in the revisits than in the single visits (p=0.007) (Table 2).

Morphine was used in 18 visits. The most frequent diagnoses were myocardial infarction (77.8%), musculoskeletal pain (16.7%), and abdominal pain (5.6%). Fentanyl was used in only one visit, and it was ordered for musculoskeletal pain.

Psychotropics

Diazepam was used in 339 visits. Anxiety/agitation was the most common diagnosis in 69.1% of the patients who received this drug, followed by acute exacerbation of psychiatric diseases (13%) and convulsion (12.4%). Among these visits, 23.6% were revisits. Acute exacerbation of psychiatric diseases was more frequent in the revisits, whereas anxiety/agitation was more prevalent in the single visits (p<0.001) (Table 3). Rectal diazepam was used in 17 pediatric patient visits for convulsions.

Biperiden was ordered for 119 visits. Among all indications for biperiden, acute exacerbation of psychiatric diseases accounted for 70.6%, and anxiety/agitation comprised 29.4%. In total, 43.7% were revisits. The rate of revisits was higher in acute exacerbation of psychiatric diseases (51.2%) than in anxiety/agitation (25.7%) (p=0.011).

Midazolam was ordered for 114 visits. It was used mostly in sedation procedures (89.5%) and treatment for convulsions (10.5%). Thiopental and ketamine were used in three visits each for sedation procedures.

DISCUSSION

Between 2005 and 2007 in the US, the proportion of ED visits wherein controlled medications were prescribed was three-folds higher than that of ambulatory office visits for patients aged 15–29 years (10). Another study conducted in the US reported

Table 1. Clinical conditions in which Tramadol was used in the ED visits

	ED visits			
Clinical conditions, n (%)	**Total**	**Single**	**Multiple**	**p**
Musculoskeletal disease	140 (29.1)	114 (32.4)	26 (20.2)	<0.001
Nonspecific abdominal pain	108 (22.5)	95 (27.0)	13 (10.1)	
Renal colic	83 (17.3)	66 (18.8)	17 (13.2)	
Cancer pain	78 (16.2)	15 (4.3)	63 (48.8)	
Lumbalgia	42 (8.7)	35 (9.9)	7 (5.4)	
Headache	21 (4.4)	19 (5.4)	2 (1.6)	
Cholelithiasis	4 (0.8)	3 (0.9)	1 (0.8)	
Dysmenorrhea	2 (0.4)	2 (0.6)	0 (0)	
Arterial embolism	2 (0.4)	2 (0.6)	0 (0)	
Chest pain	1 (0.2)	1 (0.3)	0 (0)	
Total	481 (100)	352 (100)	129 (100)	

ED: emergency department

Table 2. Indications of Pethidine in the ED visits

	ED visits			
Clinical conditions, n (%)	**Total**	**Single**	**Multiple**	**p**
Musculoskeletal disease	33 (47.1)	29 (54.7)	4 (23.5)	0.007
Nonspecific abdominal pain	13 (18.6)	10 (18.9)	3 (17.6)	
Cancer pain	9 (12.9)	2 (3.8)	7 (41.2)	
Renal colic	8 (11.4)	6 (11.3)	2 (11.8)	
Headache	4 (5.7)	3 (5.7)	1 (5.9)	
Lumbar pain	2 (2.9)	2 (3.8)	0 (0)	
Myocardial infarction	1 (1.4)	1 (1.9)	0 (0)	
Total	70 (100)	53(100)	17(100)	

ED: emergency department

that the proportion of ED visits where any opioid medication was prescribed increased from 20.8% to 31.0% between 2001 and 2010 (6). In Turkey, the rate of controlled prescription use by healthcare centers in Istanbul for the city's population was 3.5% in 2009 (8). According to our study, controlled medication was used in 1% of all ED visits. Because the aforementioned previous studies reported data on prescriptions of controlled medications in healthcare settings, there is insufficient data regarding the use of parenteral medications during ED visits. Nevertheless, the rate obtained in the present work is much lower than that reported in western countries.

A study conducted in the US reported that the mean age of adult patients who are prescribed controlled substances during ED visits is 44 years (11). A research performed in a family medicine unit in Turkey showed that mean age of all aged patients who are prescribed psychotropic substances is between 32 and 39 years (9). This study found that the median ages of patients in national and international studies are similar.

Sutter et al. (12) showed that the most commonly used parenteral opioids in 2013 in the US were morphines (52.8%), hydromorphones (42.9%), and fentanyl (4.3%). A review performed by Patanwala et al. (13) showed the most commonly studied intravenous opioids in prehospital and ED settings as morphines, hydromorphones, fentanyl, and meperidine (pethidine). According to the International Narcotics Control Board (INCB) reports for 2017, buprenorphine, codeine, ethylmorphine, morphine, oxycodone,

Table 3. Indications of Diazepam in the ED visits

	ED visits			
Clinical conditions, n (%)	**Total**	**Single**	**Multiple**	**p**
Anxiety / agitation	231 (68.1%)	183 (70.7%)	48 (60%)	0.001
Acute exacerbation of psychiatric diseases	44 (13%)	22 (8.5%)	22 (27.5%)	
Convulsion	42 (12.4%)	34 (13.1%)	8 (10%)	
Vertigo	16 (4.7%)	14 (5.4%)	2 (2.5%)	
Headache	5 (1.5%)	5 (1.9%)	0 (0%)	
Sedation	1 (0.3%)	1 (0.4%)	0 (0%)	
Total	339 (100%)	259 (100%)	80 (100%)	

ED: emergency department

diphenoxylate, pethidine, fentanyl, and remifentanil were the principal narcotics consumed in 2016 in Turkey. Furthermore, the INCB reported levels of consumption of narcotics in Turkey for 2014–2016 (excluding preparations in Schedule III). The mean consumptions of fentanyl, buprenorphine, morphine, pethidine, oxycodone, hydromorphone, and others were 593, 53, 17, 16, 6, 2, and 18, respectively, in defined daily dose (DDD) per million inhabitants per day (14). In the present study, tramadol (Schedule IV), which is under national but not international control, was found to be the most commonly administered parenteral drug during ED visits, followed by pethidine, morphine, and fentanyl. These results differ from those in the INCB report because while INCB reported the use of all narcotic drugs in Turkey, only parenteral narcotics in EDs were evaluated in the present study.

Hoppe et al. (15) showed that the most prevalent diagnoses associated with opiate prescriptions in US EDs are back pain (10.2%), abdominal pain (10.1%), and extremity fracture (7.1%). O'Connor et al. (16) stated that the most common indications of intravenous morphine or hydromorphone are abdominal pain, trauma, and back pain. Similar to the literature, the present study found musculoskeletal pain and abdominal pain to be the most common indications.

Patel et al. (17) stated that nearly one-third of cancer patients receive any opioid during their ED visits. A study conducted by Ernst et al. (18) reported that 19% of patients on opioid medications for chronic pain revisit EDs within 90 days. In the current work, the rate of ED revisit was approximately 25%, of which more than 40% was related to cancer pain in the tramadol and pethidine groups.

According to a Centers for Disease Control and Prevention report regarding controlled substance prescription patterns, opioid analgesics were prescribed approximately twice as often as stimulants or benzodiazepines in 2013 in the US (19). Nevertheless, EDs have seen a sharp increase in benzodiazepine-related visits (20). Pharmacologic interventions (antipsychotics or benzodiazepines) are often used under certain conditions, such as acute agitation, which is becoming an increasingly common presentation to EDs. Benzodiazepines are not typically the first choice for these indications. However, because antipsychotics are not controlled medications, diazepam and biperiden were reported in this study.

In the literature, there is insufficient demographic data regarding the medical use of psychotropic drugs in EDs. According to an INCB report, the average consumption of benzodiazepines (group K - anxiolytics) in Turkey in 2015–2017 was 2.9 in DDD per thousand inhabitants per day (14). A study conducted in the United Kingdom reported that 26.1% of the population has taken a benzodiazepine or a Z-drug either under medical direction or misuse (21). Another study reported that among all patient visits from 1993 to 2010 in US ambulatory healthcare settings, the rate of benzodiazepine-related visits was 3.5%. In addition, the rate of anxiety and mood disorders is approximately 40% in patients with benzodiazepine prescriptions (22). In the current study, anxiety and agitation were the most common cause of ED visits (about 70%) among patients receiving diazepam, while acute exacerbation of psychiatric diseases was the most prevalent cause of ED visits (around 70%) in patients receiving biperiden. For both medications, the rate of revisits was more common for acute exacerbation of psychiatric diseases. Midazolam, which is a psychotropic drug, was ordered in up to 90% of visits for sedation procedures. Thiopental and ketamine were rarely used sedatives during the ED visits of patients.

CONCLUSION

Parenteral controlled medication was used in the studied clinic in 1% of all ED visits. Tramadol (under national control) and pethidine were the most typically preferred narcotics, and revisits to the ED were mainly related to cancer pain. Diazepam and biperiden (under national control) were the most common psychotropics used in the ED, and were frequently ordered for anxiety/agitation and acute exacerbation of psychiatric diseases, respectively. However, revisits to the ED were related to acute exacerbation of psychiatric diseases. Although there is insufficient data regarding the use of these controlled medications during ED visits, this rate seems to be much lower than that of developed countries' EDs. Nonetheless, regular follow-up regarding

chronic diseases may further reduce the revisits of these patients to the ED.

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