Original Article

A single subcutaneous dose of tramadol for mild to moderate musculoskeletal trauma in the emergency department

Alejandro Cardozo¹, Carlos Silva¹, Luis Dominguez¹, Beatriz Botero¹, Paulo Zambrano¹, Jose Bareño²

¹ Emergency Department, Clinica Las Vegas, Medellin, Colombia

² Epidemiology Department, Universidad CES, Medellin, Colombia

Corresponding Author: Alejandro Cardozo, Email: Galeno026@gmail.com

BACKGROUND: Mild to moderate musculoskeletal trauma is a common cause for an emergency room visit, and frequent pain is one of the cardinal symptoms of consultation. The objective of this study is to assess the perception of a single subcutaneous dose of 50 mg tramadol for pain management in patients with mild to moderate musculoskeletal trauma, likewise to appraise the perception of pain by subcutaneous injection.

METHODS: A total of 77 patients, who met inclusion criteria, received a single subcutaneous dose of tramadol. Pain control was evaluated based on the verbal numerical pain scale (0–10) at baseline, 20 and 60 minutes; similarly, pain perception was evaluated secondary to subcutaneous injection of the analgesic.

RESULTS: On admission, the average pain perceived by patients was 8; twenty minutes later, 89% of the patients reported five or less, and after sixty minutes, 94% had three or less on the verbal numerical pain scale. Of the patients, 88% reported pain perception by verbal numeric scale of 3 or less by injection of the drug, and 6.5% required a second analgesic for pain control. Two events with drug administration (soft tissue infection and mild abdominal rectus injection) were reported.

CONCLUSION: We conclude that a single subcutaneous dose of tramadol is a safe and effective option for the management of patients with mild to moderate pain and musculoskeletal disease in the emergency department.

KEY WORDS: Tramadol; Analgesic routes; Subcutaneous; Acute pain; Emergency department

World J Emerg Med 2014;5(4):275–278

DOI: 10.5847/wjem.j.issn.1920–8642.2014.04.006

INTRODUCTION

Acute pain is one of the leading causes of visits to the emergency department (ED),^[1–4] including a large percentage that is secondary to mild to moderate musculoskeletal trauma,^[5] representing an important ED overcrowding and extended service times associated with poor control of disabling pain.^[6–8]

The analgesic routes in health services are defined as enteral and parenteral; within the latter, the subcutaneous (SC) route has been insufficiently studied in urgent

patients.

Hence, we seek to know if SC tramadol is perceived as effective by patients with mild to moderate musculoskeletal trauma admitted in a defined period in our ED.

The study aimed to evaluate the effectiveness of SC tramadol in patients with mild to moderate musculoskeletal trauma based on the verbal numerical pain scale at twenty and sixty minutes, so as to assess whether the pain perceived by SC injection supports its administration in relation to the pain perceived by the trauma.

METHODS

Clinica Las Vegas in Medellin, Colombia, is a tertiary care complexity center with 51 000 visits per year. Approximately, 20% of visits correspond to mild to moderate musculoskeletal trauma due to workplace, traffic-related, domestic, or sports accidents. In September and October, 2013, 77 patients who met inclusion criteria were attended. The patients included those with mild to moderate musculoskeletal trauma aged over 18 years. They were ED walk-in patients who did not require stitches and had no exclusion criteria: patients who were previously medicated with analgesics before consulting the ED or that had been consuming painkillers for some pathology, epilepsy, liver disease, tramadol allergy, trauma requiring hospitalization or intravenous medication according to the opinion of treating physician, or pregnancy.

This study was approved by the ethical committee of the clinic prior to verbal patient consent and verification of tramadol blister for subcutaneous delivery authorized by the Instituto Nacional de Vigilancia de Medicamentos (INVIMA). A single subcutaneous dose (50 mg) was supplied. The injection was provided by nursing assistant using hypodermic syringe of insulin in the periumbilical area following the same technique of insulin delivery. For each patient, a record consisting of a checklist of inclusion and exclusion criteria and boxes to record the number given by the patient in the verbal pain scale (0 no pain; 10 severe pain) to the injury perceived by the trauma at 20 and 60 minutes after the administration of tramadol. The same pain scale was used to record the value perceived by subcutaneous injection. Likewise, the need for rescue medication was assessed.

Study type

An observational prospective registry, or the questionnaire to pain scales (initial trauma pain and subcutaneous pain) was designed by a blinded doctor on the collection of data. Statistical analysis was performed by SPSS version 18, and Friedman's test was used to compare pairwise results.

RESULTS

In September and October, 2013, 77 patients were included in the registry. In this series, 74% were men (Table 1). Their mean age of the patients was 31 years (18–55). 53% of the patients were diagnosed with minor

Table 1. Demographic and clinical characteristics

Variables	Number of patients (n, %)
Gender: Male (n,%)	57 (74)
Age	
Mean (SD)	31.97 (9.34)
Min- Max	18–55
Admission diagnosis	
Minor trauma*	41 (53.2)
Sprain	10 (13)
Low back pain	9 (11.7)
Finger fracture	8 (10.4)
Others	9 (11.7)
Pain scale median (IQR)	8 (7–8)
Another painkiller required	72 (93.5)

SD: standard deviation; IQR: interquartile range; *: contusions, superficial burns, elongation.

Table 2. Comparisons before and after subcutaneous tramadol (20 and 60 minutes)

Analogue scales	Baseline pain due to trauma 0 minute	20-minute -scale	60-minute -scale	P value
Patients (n)	77	77	68	
Median (IQR)	8 (7–8)	3 (2–4)	2 (1–3)	<0.001

Table 3. Verbal pain scale to a tramadol subcutaneous injection

Analogue scales	Number of patients (n, %)
1	46 (59.7)
2	17 (22.1)
3	5 (6.5)
4	1 (1.3)
5	5 (6.5)
7	1 (1.3)
8	2 (2.6)

musculoskeletal trauma, 13% with sprain, 11% with acute low back pain, and 10% with closed fractured fingertips.

The average pain according to the verbal scale at baseline was 8, after 20 minutes was 3; and following 60 minutes was 2 (Table 2). Only 6.5% of the patients required a second medication for persistent pain. 88% of the patients revealed three or less on the verbal pain scale during application of the subcutaneous medication (Table 3).

DISCUSSION

Tramadol is a weak opioid with low affinity for receptors, but with activity in monoaminergic pathways by inhibiting the reuptake of norepinephrine and increasing the release of serotonin, providing an analgesic profile with fewer side-effects than pure

opioids, making it more tolerable.^[9,10] Classically, tramadol has been used parenterally with the presumption of greater analgesic potency bioavailability; however, there have been reported side-effects, most frequent nausea (6.1%), dizziness (4.6%), drowsiness (2.4%), tiredness/ fatigue (2.3%), sweating (1.9%), vomiting (1.7%) and dry mouth (1.6%), less common pruritus, subcutaneous nodules and seizures.^[11–14]

The security profile of single doses or less than 24 hours administration is similar, leaving tramadol as a safe drug that can be used differently for rectal, intravenous, sublingual, muscular, oral, regional analgesia or subcutaneous infusion. These routes have been explored in postoperative pain, labor, abdominal pain, trauma and chronic conditions such as pain due to cancer and neuropathic pain.^[15–18]

The subcutaneous route is used in emergency services because of its easy preparation and administration, especially because difficult vascular access may delay patient care.^[19,20] A single 50 mg-SC dose of tramadol is a useful alternative in patients presenting to the ED for mild to moderate musculoskeletal trauma, with a significant reduction in pain on the verbal scale, with a success rate of 50% at 20 minutes and 75% at 60 minutes and a low incidence of adverse events or complications. Other studies^[21] investigated subcutaneous tramadol for acute pain in the ED because of a broader range of causes. We focused on musculoskeletal causes since they are very common in our ED.

A subcutaneous alternative is safe and fast and helps to reduce the rate of unnecessary intravenous medication and to assist in patient's satisfaction in managing pain.^[22–25]

In conclusion, a single subcutaneous 50 mg dose of tramadol is a useful and safe alternative in patients presenting to the emergency department for mild to moderate musculoskeletal trauma, with a significant reduction in pain at 20 and 60 minutes after application. Pain perception of the injection by patients supports its application in the emergency department.

Funding: None.

Ethical approval: This study was approved by the ethical committee of the clinic prior to verbal patient consent and verification of tramadol blister for subcutaneous delivery authorized by the Instituto Nacional de Vigilancia de Medicamentos (INVIMA).

Conflicts of interest: The authors declare that there is no conflicts of interest relevant to the content of the article.

Contributors: Cardozo A proposed the study, analyzed the data and wrote the first draft. All authors contributed to the design and interpretation of the study and to further drafts. The authors declare no conflicts of interest.

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Received March 11, 2014

Accepted after revision August 10, 2014