Brief communication

Lidocaine for pain relief in palliative care patients, a case series

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Abstract

Introduction. Neuropathic pain affects 2 % of the population and 15 out of 100 patients who go to a physician suffer from neuropathic pain. This type of pain is common in cancer patients. **Objective.** To determine if the use of lidocaine in intravenous infusion reduces neuropathic pain in palliative care with opioid treatment. **Methodology.** Case series of three patients in palliative care who presented neuropathic pain and underwent multiple infusions of intravenous lidocaine as an adjuvant for pain management; the doses used and the number of infusions were described, pain improvement was evaluated through the visual analog scale and possible side effects were monitored. **Results.** Case 1: visual analogue scale on admission 9/10; 24 hours post lidocaine infusion: 4/10. Case 2: visual analogue scale on admission 6/10; 24 hours post lidocaine infusion 2/10. Case 3: visual analogue scale on admission 8/10; 24 hours post-infusion 2/10. **Conclusion.** Intravenous infusion of 2 % lidocaine reduced neuropathic pain in the three patients of the study, however, the relief is transitory, and the positive effect is lost over time.

Keywords

Pain Management, Lidocaine, Intravenous Infusion, Palliative Care.

Resumen

Introducción. El dolor neuropático afecta al 2 % de la población y 15 de cada 100 pacientes que acuden a consulta médica, sufren de dolor neuropático. Este tipo de dolor es muy común en pacientes con cáncer. **Objetivo.** Determinar si el uso de lidocaína en infusión endovenosa disminuye el dolor neuropático en los cuidados paliativos con tratamiento opioide. **Metodología.** Serie de casos de tres pacientes en cuidados paliativos que presentaron dolor neuropático y se les administraron múltiples infusiones de lidocaína intravenosa como coadyuvante para el manejo del dolor, se describieron las dosis utilizadas, el número de infusiones, se evaluó la mejoría del dolor a través de la escala visual análoga y se monitorizaron los posibles efectos secundarios. **Resultados.** Caso 1: escala visual análoga al ingreso 9/10; 24 horas posinfusión de lidocaína: 4/10. Caso 2: escala visual análoga al ingreso 6/10; 24 horas posinfusión de lidocaína 2/10. Caso 3: escala visual análoga al ingreso 8/10; 24 horas posinfusión 2/10. **Conclusión.** La infusión intravenosa de lidocaína al 2 % disminuyó el dolor neuropático en los tres pacientes del estudio, sin embargo, el alivio fue transitorio y el efecto positivo se perdió con el paso del tiempo.

Palabras clave

Manejo del Dolor, lidocaína, Infusiones Intravenosas, cuidados paliativos.

Introduction

Neuropathic pain (NP) originates as a direct consequence of a lesion or disease that affects the somatosensory system[1]. In this definition, the term "disease" refers to specific pathological processes, such as inflammation, and autoimmune diseases; while "lesion" refers to a macro or microscopically identifiable damage[2].

In oncology, NP is among the most challenging symptoms to alleviate, sometimes presenting as unique affection and at other times mixed with somatic or visceral pain. In non-oncological patients, chronic NP is common in clinical practice and considerably affects the quality of life[3].

Coadjuvant pharmacological treatment includes some medicines with limited effectiveness as tricyclic antidepressants, anticonvulsants, antiarrhythmic drugs, and topical analgesics such as lidocaine; less than 50 % of which bring about an adequate pain control[4].

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Lidocaína para el alivio del dolor en pacientes de cuidados paliativos, una serie de casos

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The authors declare there are no conflict of interests.

There are few protocols for the use of intravenous (IV) lidocaine as an adjuvant in the relief of neuropathic pain, such as the pain guidelines of the Latin American Federation of Pain Societies (FEDELAT), which mention that IV lidocaine infusion is used in doses of 5 mg/kg to be administered in 20 minutes, and, if there is improvement in pain, it can be used two to three times a week[5].

Other oncology centers have their schedules, and currently, there is no consensus among them; for instance, at Providence Health Care Hospital in Canada, they use bolus lidocaine, with an optional dose of 1.5 to 2 mg/kg administered three to five minutes in the perioperative period, with a usual loading dose of 100 to 160 mg. Immediately after the bolus, a low-dose IV infusion of lidocaine of 0.5 to 2 mg/kg/hour is given[6]. On the other hand, the San Diego Hospice in the United States of America mentions in their guidelines the initiation of a dose of 1 to 2 mg/kg IV over 30 minutes, and after 30 minutes of starting the dosage, the pain should be measured and documented; if the pain decreases, it must continue at a dose of 0.5 to 3 mg/kg/hour[7].

The most frequent adverse effects include periorbital numbness, dizziness, vertigo, and dysarthria, which usually are due to lidocaine accumulation in the body[1,8]. Among the less frequent are tachycardia, allergic reactions, dry mouth, insomnia, and tremor and metallic taste are occasionally reported[9].

The dosage and duration of intravenous lidocaine infusion remain controversial. The most experience exists in acute postoperative pain as some studies mention that low doses of IV lidocaine (plasma concentrations less than 5 µg/mL) do not interfere with normal nerve conductions and are associated with a lower incidence of adverse effects than other drugs[10].

The objective of this case series is to determine whether the use of IV lidocaine infusion decreases neuropathic pain in palliative care patients who also have opioid treatment.

Methodology

The study is a case series of three patients with NP; each of them receive palliative care and have consulted over ten months for pain that was difficult to control, despite management with opioid analgesics and who were determined to benefit from the use of 2 % lidocaine infusions without adrenaline as supplementary for the management of their pain.

The dose of 2 % lidocaine without adrenaline used in the three patients consisted of 200 mg (200 mg/10 mL vial), diluted in 250 ccs of 0.9 % saline solution to be given intravenously in one hour by continuous infusion pump by the attending physician. In case 1, five infusions were used, in case 2, four, and case 3, two; the time interval between each infusion was determined on an individual basis, with a variable periodicity, between one every week and then one every month.

Three adult patients were included, two men and one woman, who received treatment in a palliative care center in the outpatient or inpatient areas for ten months. The selected cases met the inclusion criteria: acceptance of intravenous lidocaine infusion as an adjuvant for the management of their neuropathic pain, being older than 18 years, having a diagnosis of pain syndromes due to various etiologies, consulting at the palliative care center with basic analgesic treatment (opioids and adjuvants), and having a Visual Analog Scale (VAS) score greater or equal to 4 points.

VAS was measured according to the FEDELAT tools[5] and consisted of a horizontal line of 10 cm. The minimum intensity is the absence of pain; it will be mild up to 4 cm, moderate from 5 to 7 cm, and severe if greater than 7 cm, with an extreme of 10 cm indicating the maximum value of pain[11]. This scale was used for the initial selection of patients to enter the study, before administration of the infusion, and then at 24 and 72 hours.

Two other assessment scales were used; the first was the Karnofsky performance scale, which is a standard way of measuring the ability of cancer or geriatric patients to perform routine tasks. Scores range from 0 to 100, a higher score meaning that the patient is better able to perform daily activities[12]. The second scale used was the Edmonton Symptom Assessment System (ESAS)[13], which consists of visual analog scales to measure the intensity or magnitude of ten symptoms: pain, tiredness, shortness of breath, nausea, depression, anxiety, well-being, sleepiness, appetite, and insomnia[13].

All three patients received the study information sheet, the statement about the adverse effects that could occur, and measures to be taken, and the informed consent forms were handed in and signed prior to lidocaine administration. The nursing staff recorded the vital signs before, during, and after the administration of each infusion and the adverse effects they presented, and the three patients were closely monitored for the length of the study. The research ethics committee of the Universidad Dr. José Matías Delgado approved the Study in Act record number 001-2021.

Case description

Case 1.

It is about a 58 years old man with a Karnofsky index of 60 % who was admitted to the palliative care unit with an oncologic diagnosis of adenocarcinoma of the rectum and sigmoid colon, with mixed pain (neuropathic and bone) of marked intensity located in the right lower limb, an acute compressive fracture in the L1 vertebral body and non-compressive cauda equina syndrome following radiotherapy. On admission, the patient presented a severe pain sensation in the right hip that radiated to the right lower limb with a VAS score of 9/10 and described it as "cramping." In addition, there was a history of diabetes *mellitus* treated with metformin 1000 mg and glimepiride 2mg and a history of arterial hypertension treated with olmesartan 20 mg and amlodipine 5 mg, both diseases were decompensated.

Before admission, the patient was on basic treatment with morphine sulfate, 60 mg every 12 hours, and rescue doses of tramadol 37.5 mg up to every four hours, which he maintained for one year. During the two-day admission, the base treatment was suspended and changed to morphine sulfate 10mg subcutaneously every four hours and pregabalin 75 mg orally every 12 hours, with 6 mg subcutaneous rescue doses up to every hour. He remained hospitalized, with severe pain, requiring rescue medication four times in 24 hours since he presented pain incidental to mobilization, defecation, or ambulation. The indicated dose of morphine was maintained one month after discharge, and he remained in uncontrolled pain before using the first infusion with 200 mg of lidocaine (Figure 1). After the first infusion, the patient had no side effects or significant changes in blood pressure (Table 1).

Case 2.

A 61 years old man with a Karnofsky index of 70 % attended at home with a diagnosis of failed back syndrome secondary to a disc herniation (several L1-L5 segments) and had surgery with segmental and neurological sequelae plus chronic pain syndrome. He received multiple pain management for more than four years, including neuromodulators with no positive results, except for some blocks that generated a slight benefit. He requested medical consultation for neuropathic pain in the lumbar region of high intensity, with a burning sensation that radiated to the inguinal region and both

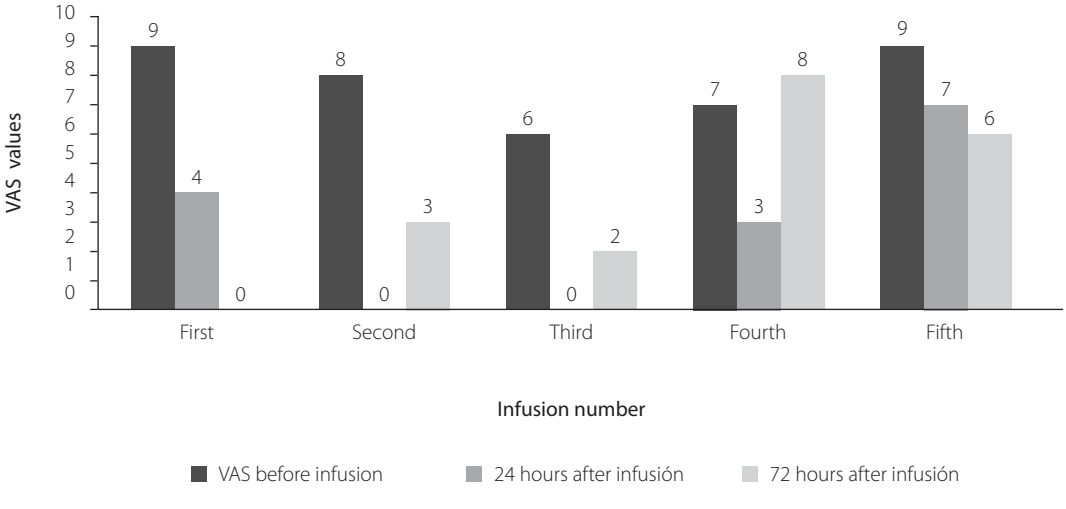

Figure 1. ESAS value, pain before and after lidocaine infusion, case 1

Table 1. Vital sign values of case 1 before, during, and after lidocaine infusion

	Arterial Blood Pressure (mmHg)			Heart Rate (bpm)			Oxygen Saturation (%)		
Infusion number	Before infusion	During infusion	After infusion	Before infusion	During infusion	After infusion	Before infusion	During infusion	After infusion
First	160/80	170/80	150/80	92	89	89	97 %	97 %	97 %
Second	120/70	120/60	120/60	107	106	100	98 %	97 %	97 %
Third	140/80	130/70	130/70	81	80	87	99 %	96 %	96 %
Fourth	140/70	130/70	130/70	97	74	72	98 %	92 %	93 %
Fifth	140/90	140/90	135/88	102	98	96	96 %	95 %	96 %

lower limbs, predominantly on the left, which made it difficult for him to ambulate; he also expressed "feeling like he was walking among stones." Since the first consultation at the hospital center, treatment was started with morphine sulfate 20 mg subcutaneously every four hours, maintaining this therapeutic plan for seven months. It was suspended before the first lidocaine infusion (Figure 2). The patient's vital signs were registered during the lidocaine infusion with 200 mg (Table 2); no significant changes in vital signs or abnormal parameters were reported.

Case 3.

A 78 years old woman, with a Karnofsky index of 60 %, with a non-oncologic diagnostic consulted with a history of progressive posterior thoracic pain due to multiple vertebral fractures secondary to osteoporosis, with exacerbation of neuropathic pain in the last month and a sensation of "tingling" and "pins and needles like electricity" in both lower limbs that was not relieved by any analgesic. The patient reported a history of having undergone vertebroplasty at lumbar levels L1 - L2 and L3 - L4 three months earlier, with slight improvement. She was under treatment with tapentadol 50 mg orally every eight hours and a rescue dose of morphine, 5 mg subcutaneously 3-5 times daily. During the consultation, uncontrolled pain was evaluated, and it was decided to administer lidocaine infusion at a dose of 200mg IV to be given in one hour (Figure 3). No significant changes or out-of-normal parameters in the patient's vital signs were reported (Table 3).

Results

In case 1, during the first infusion, a decrease in pain was reported with a previous VAS of 9/10 points (Table 1), which dropped 4 points at 24 hours, and 0 points at 72 hours. Psychological factors affecting the perception of pain were taken into consideration, and the patient also presented a urinary tract infection during the last infusion. Antibiotic treatment was started, and hypoglycemic treatment was modified to regular subcutaneous insulin according to glycemia.

In case 2, the patient obtained a VAS score of 6 points (Table 2); infusions were administered once a week for two consecutive months. At 24 hours a reduction of 2 points was obtained, and at 72 hours later, in all the infusions a decrease in pain was observed.

In case 3, the patient presented 8 VAS points at the beginning of the process (Table 3), which decreased to 2 points at 24 hours after the administration of the first infusion and remained on a 3-point scale after 72 hours. The frequency of infusions was one every month, taking into account social factors of distance to the treatment center.

Discussion

There is evidence that supports the effectiveness of lidocaine 2 % IV for the treatment of the different etiologies of neuropathic pain, considering it as complementary treatment[14]. A recent systematic review concludes that lidocaine and other adjuvants are safe in controlled clinical trials for neuropathic pain and were better than placebo and as effective as other analgesics[15]. The doses of lidocaine used in all cases were obtained according to previous studies describing adequate tolerability and safety[16].

Evidence of benefit in terms of pain improvement beyond six hours is scarce17. However, in this study a significant improvement in pain was observed after 24 and 72 hours; this relief subsided over the course of time and required new infusions afterward.

Moulin D *et al.* agree that the effect of lidocaine is transitory and starts to work 30 to 60 minutes after its IV administration, and its effects can last from two to six hours after the infusion is finished, after which the analgesic effect disappears rapidly[18].

Adverse effects were not recorded in any of the cases; however, most of the time are usually mild and can be managed by decreasing the infusion rate or in some cases, suspending the infusion until the adverse effect subsides; this was not necessary in the patients in the study[9].

Conclusion

Intravenous infusion of lidocaine 2 % decreased neuropathic pain in all three patients in the study; however, the relief was transient, and the positive effect faded over time with no adverse effects to the drug.

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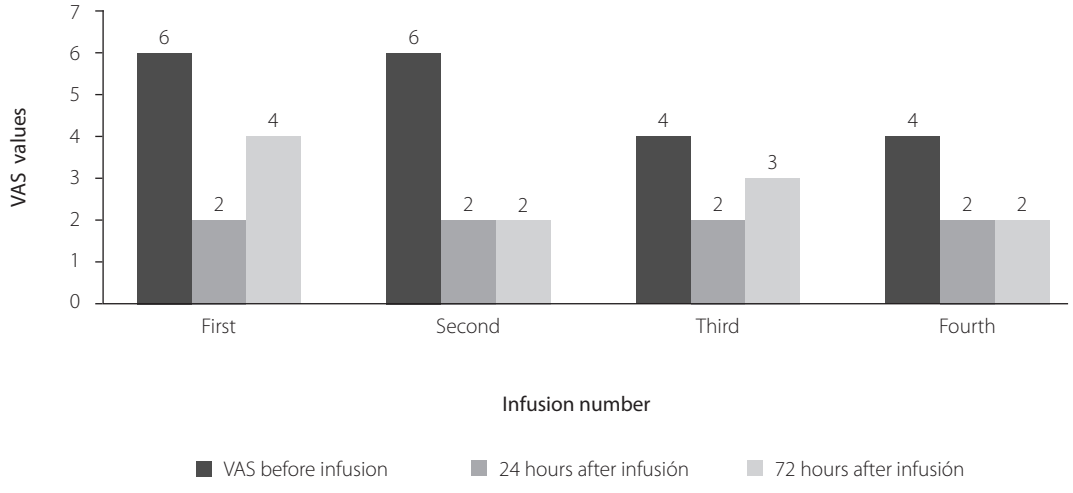

Figure 2. ESAS value, pain before and after lidocaine infusion, case 2

Table 2. Vital sign values of case 2 before, during, and after lidocaine infusion

	Arterial Blood Pressure (mmHg)			Heart Rate (bpm)			Oxygen Saturation (%)		
Infusion number	Before infusion	During infusion	After infusion	Before infusion	During infusion	After infusion	Before infusion	During infusion	After infusion
First	112/66	118/76	118/70	72	79	76	97 %	96 %	96 %
Second	99/60	93/61	114/71	71	77	77	96 %	97 %	95 %
Third	97/50	104/67	99/58	68	69	70	94 %	95 %	94 %
Fourth	96/55	102/58	95/51	68	66	63	96 %	93 %	93 %

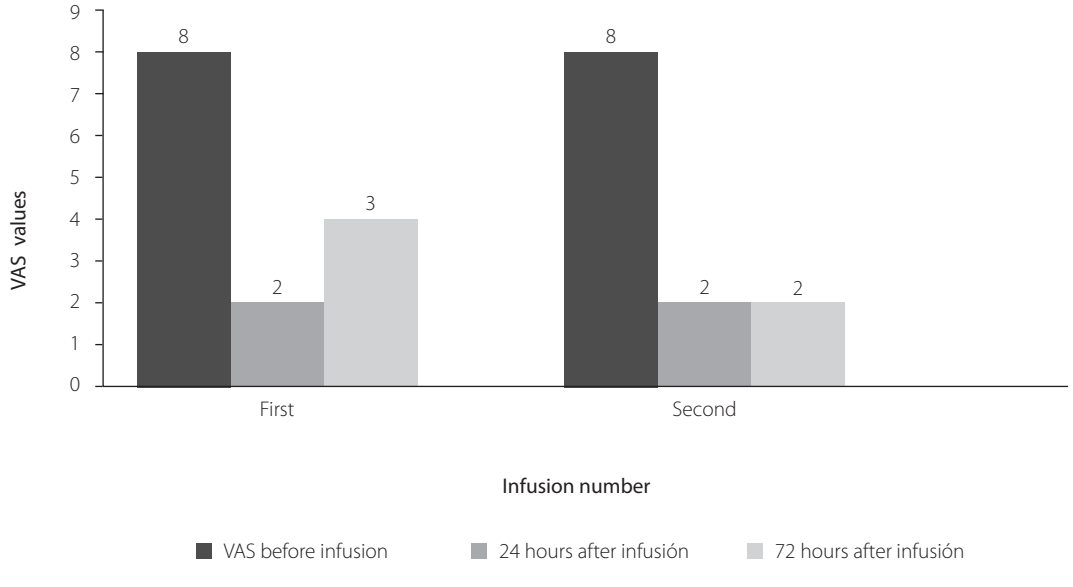

Figure 3. SAS value, pain before and after lidocaine infusion, case 3

Table 3. Vital sign values of case 3 before, during, and after lidocaine infusion

	Arterial Blood Pressure (mmHg)			Heart Rate (bpm)			Oxygen Saturation (%)		
Infusion number	Before infusion	During infusion	After infusion	Before infusion	During infusion	After infusion	Before infusion	During infusion	After infusion
First	110/70	150/80	140/70	72	63	63	98 %	97 %	97 %
Second	110/70	140/80	140/80	70	63	63	98 %	97 %	97 %

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