

The Immediate Effect of Combined Lidocaine and Ketamine Infusion on Neuropathic Pain: Five-year Retrospective Observational Study

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Introduction

Chronic pain is the leading cause of disability worldwide and is associated with the highest economic cost among all psychiatric and neurologic disorders (1). The impact of pain has many negative consequences in previously healthy adults including loss of work productivity, lost wages, fewer work hours, and increased associated cost of care in the elderly. In the U.S., the economic cost of pain to society, which comprises health care costs and lost productivity value, was estimated to be at least 560 billion dollars in 2010 (2).

Objectives

A retrospective review of the immediate effect of intravenous lidocaine and ketamine infusion (IVLK) on chronic non-cancer pain patients.

Methodology

The electronic charts of 670 patients who received infusion(s) of lidocaine and ketamine (IVLK) were investigated from March 2013 to May 2017. According to the diagnosis stated in the charts, 51.8% of the patients suffered from a form of neuropathic pain, other than fibromyalgia, and 40.9% received the infusion to help with the pain. The number of infusions for each patient varied as patients determined how many infusions they need. In total, 3,741 infusions were reviewed.

Study Outcomes

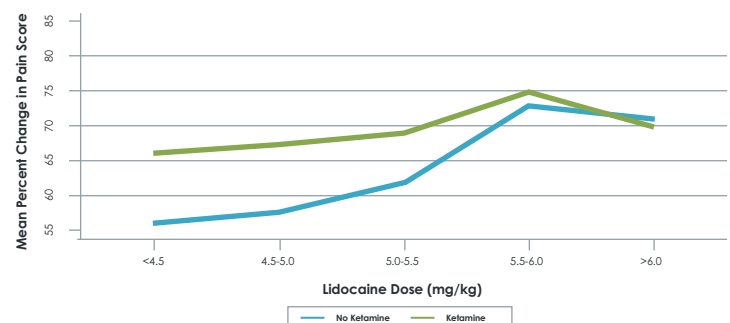
The primary study outcome was to determine the proportion of patients who achieved at least a $\geq 30\%$ reduction in their pain scores. The secondary outcome was to interpret the change in the raw score in terms of medication dosage.

*35th Annual Meeting of American Academy of Pain Medicine, Mar 2019, Denver, CO, USA

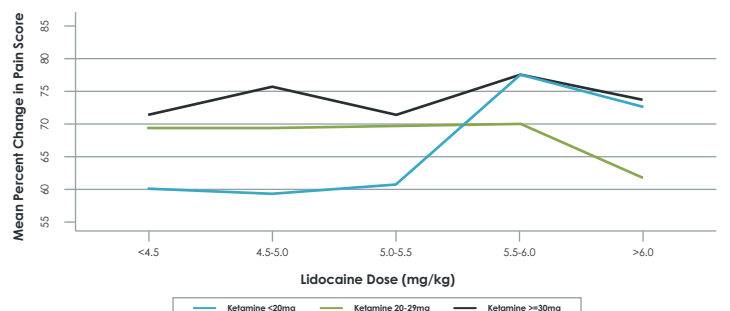
*41st Annual scientific Meeting of Canadian Pain Society
May 2020 Conditionally approved by IRB

		Number	Percentage
Age Categories	20-39 Y	107	16.5%
	40-59 Y	356	53.1%
	>= 60 Y	207	30.9%
Gender	Female	508	75.8%
	Male	162	24.2%
Diagnosis	Fibromyalgia	274	40.9%
	Chronic Wide Spread Pain Syndrome	347	51.8%
	Headache- Concurrent	7	1%
Number of Infusion (Median, IQR 3.00, 1.00, 8.00)	CRPS	42	6.3%
	1	184	27.6%
	2	113	16.9%
	3	75	11.2%
	4	41	6.1%
	>= 5	254	38.1%
Other Procedures	Yes	397	59.3%
	No	273	40.7%

Pain Relief with and without Adding Ketamine



Relationship between Pain Relief for Different Ketamine Dosages



Results

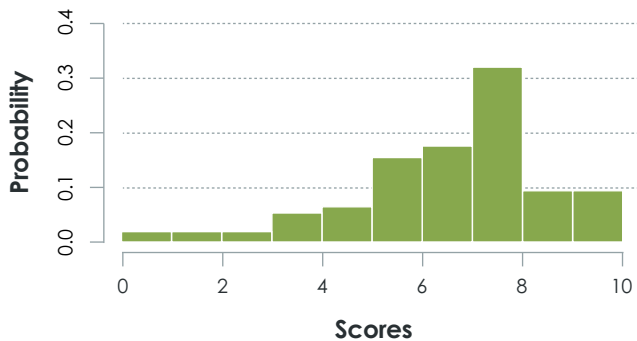
In this analysis, 670 subjects (508 females, 162 males) were treated at Allevio Pain Management by Dr. Safakish from March 2013 to May 2017. The mean age was 53.2 ± 13.4 and the mean weight (kg) was 80.7 ± 20.3 . Regarding the diagnoses, half of the patients had neuropathic pain (51.8%), followed by fibromyalgia (40.9%), complex regional pain syndrome (CRPS) (6.2%) and chronic headache (1.0%). The median number of infusions was three, and 38% of patients received more than five infusions for their condition. In total, we analyzed 670 patients and 3,741 infusions. The population of the patients was heterogeneous concerning the diagnosis, age, and sex.

Among patients with more than one infusion, the proportion of fibromyalgia and CRPS were slightly higher, while among those with one infusion, neuropathic pain, with other etiology, was the most common diagnosis.

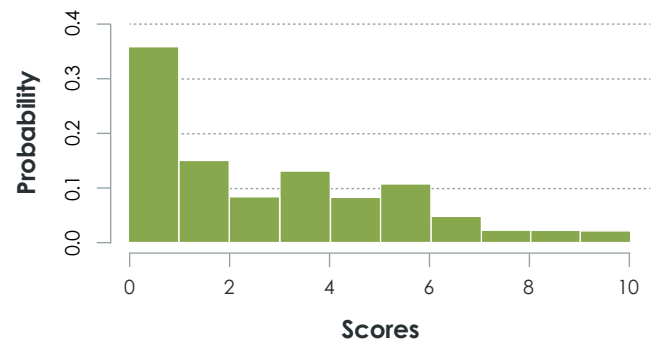
This was a random finding and could be speculated that patients with fibromyalgia had a better response to the infusions. In addition, presumably ketamine helped their mood.

Ketamine and lidocaine were administered collectively in 95% of the infusions ($n=3522$). Patients who received a combination of ketamine and lidocaine experienced significantly more pain relief than those who did not receive ketamine. An increase in lidocaine dosage was associated with greater pain relief, however, the effect plateaued after 6mg/kg. In the multivariable analyses, the impact of lidocaine dosage (mg/kg) on pain relief revealed borderline significance only, while an increase in ketamine dosage (mg) was associated with clinically meaningful pain relief.

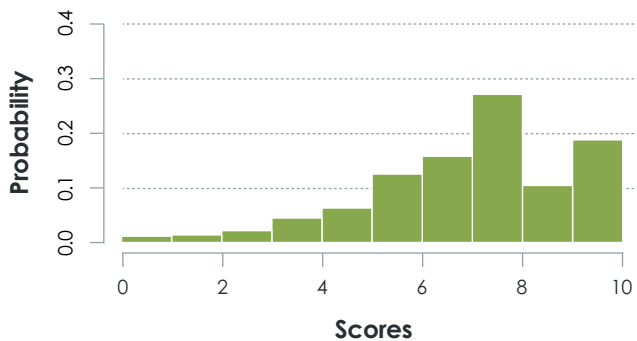
Pain Scores Before Infusion



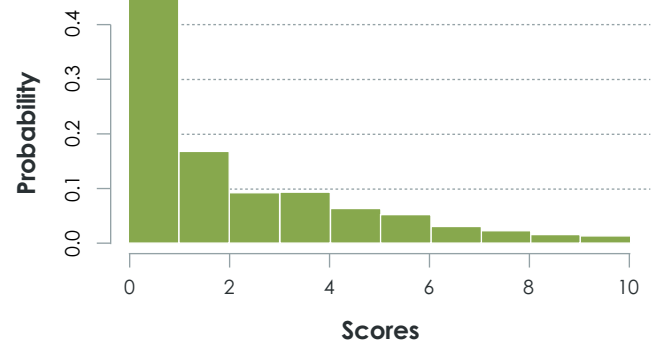
Pain Scores After Infusion



Pain Scores Before Infusion



Pain Scores After Infusion



Lidocaine Dosage (mg/kg) Over Time



Conclusion

We propose that IVLK would be beneficial to control the perioperative pain in individuals suffering from chronic neuropathic pain. Anesthesiologists often experience the difficulty of controlling postprocedural acute pain in individuals with a significant amount of pain preoperatively (treatment of acute on chronic pain).

Over the years, various techniques have been proposed to control perioperative pain, which includes the administration of gabapentin, acetaminophen, nonsteroidal anti-inflammatory agents (NSAIDs), and a more aggressive approach of using short-acting narcotic preoperatively to the point that the patient feels comfortable.

From our research analysis, we propose a different approach. IVKL acts acutely by rapidly reducing pain levels, and it also works overtime by blocking N-methyl-D-aspartate (NMDA) receptors, which reduces the chance of developing a new chronic pain condition. The maximum benefit of lidocaine has been achieved at 5.5-6 mg/kg without ketamine. Therefore, we recommend using 5.5 mg/kg, unless IV lidocaine is contraindicated. When a ketamine infusion is a treatment option, we propose using 30 mg of ketamine (in less than 100 kg patients), as the same pain reduction could be achieved with much lower lidocaine at 4.5 mg/kg. With a lower dosage, ketamine has a safe profile. The neurotoxicity of lidocaine is dose dependent. Therefore, it is logical to use a lower dose of lidocaine.

References

1. Bonica, J. J. (1953). The Management of Pain. Philadelphia: Lea and Febiger.

2. Wahl, A. K., Rustøen, T., Rokne, B., Lerdal, A., Knudsen, Ø., Miaskowski, C., & Moum, T. (2009). The complexity of the relationship between chronic pain and quality of life: a study of the general Norwegian population. *Qual Life Res*, 18(8), 971-980. doi:10.1007/s11136-009-9515-x