Evaluation of the Effects of Lidocaine in Different Fields of Medicine

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Lidocaine (lignocaine), is an amide which is derived from xylidine, and its efficacy rapidly became widespread, given its superior safety profile compared to previous anesthetic compounds (1). This agent is commonly used for local anesthesia, often combined with epinephrine (which is used as a vasopressor and can extend its duration of action by opposing the local vasodilator effects of lidocaine) or can be used during advanced airway management as an adjuvant to tracheal intubation. Lidocaine can relieve neuropathic pain, hyperalgesia, and complex regional pain syndrome (2).

The use of lidocaine compounds with other drugs, such as a combination of 10 ml 2% lidocaine and epinephrine 1: 100000 for topical anesthesia, does not cause significant changes in blood pressure, ischemia, and arrhythmia in patients with heart disease, pointing to the safety of lidocaine and lidocaine solution (3).

In Uzun *et al*., (4) study, no statistically significant difference was found for lidocaine infusion usage for hypotensive anesthesia about different parameters. New investigations with different local anesthetic agents may show significant differences and the usage of these local anesthetic agents.

Dehnadi Moghadam *et al*., (5) in their study indicated a significant decrease in spasticity of patients with traumatic brain injury (TBI) using continuous intranasal infusion of lidocaine 0.5%. No relief of severity and decrease in frequency of spasticity for these patients were reported after their treatment with the maximum dosage of baclofen for 48 hours.

In another study, fentanyl and intrauterine lidocaine were investigated in the treatment of 11 patients with spasms due to spinal cord injury (SCI). A significant decrease in spasticity was seen within 90 minutes after the injection by combining lidocaine and fentanyl (6).

Rupture of intracranial aneurysm is most likely to occur during induction of anesthesia because of the resulting spike in blood pressure. Thus, a smooth induction has been stressed in such patients. Using lidocaine before endotracheal intubation can create hemodynamic stability and prevent this increase in blood pressure. Zahid Hussain Khan *et al*., used lidocaine as the sole anesthetic agent for induction and maintenance during aneurysm surgery in four cases. Significant reduction in blood pressure was the hallmark of the study both during induction and the course of surgery. Bleeding, intracranial pressure, and extubation time were acceptable and as effective as propofol as a standard substance used in surgery. Due to the fewer cost and comparatively fewer side effects and lack of hypnotic properties, it can be an acceptable induction agent and a maintenance drug in this type of surgery (7).

Intravenous lidocaine plays an important role in the hemodynamic stability of patients under general anesthesia, without additional effect on neuromuscular blockade even when combined with magnesium sulfate. Lidocaine and magnesium sulfate indirectly block sympathetic effects and are well-established in multimodal opioid analgesic strategies (8).

In an animal study on dogs, propofol and lidocaine administration prevented a significant increase in the mean arterial blood pressure (MAP) and heart rate during intubation. Recovery from anesthesia was smooth and excitement-free (9). Based on various applications of lidocaine discovered so far, including anesthetic, antiarrhythmic, analgesic, and as an aid for tracheal intubation. Its use can be expanded considering its variable efficacy through conducting clinical trials.

References

1. Bahar E, Yoon H. Lidocaine: A Local Anesthetic, Its

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Adverse Effects and Management. Medicina (Kaunas). 2021;57:782.

2. Lu J, Tian W, Cui L, Cai B, Zhang T, Huang N, et al. Lidocaine-eluting endotracheal tube effectively attenuates intubation related airway response. Ann Transl Med 2021;9:871.
3. Sanatkar M, Sadeghi M, Esmaeili N, Naseri MH, Sadrossadat H, Shoroughi M, et al. The evaluation of perioperative safety of local anesthesia with lidocaine containing epinephrine in patients with ischemic heart disease. Acta Med Iran 2013;51:537-42.
4. Uzun S, Yuce Y, Erden A, Aypar U. Impact of perioperative lidocaine infusion and bis monitorization on remifentanil dosage in hypotensive anesthesia. Eur Rev Med Pharmacol Sci 2014;18:559-65.
5. Dehnadi Moghadam A, Hasanzadeh H, Dehnadi Moghadam F. Evaluation of the Effect of Intranasal Lidocaine in the Treatment of Spasticity in Patients with Traumatic Brain Injury. Anesth Pain Med 2021;11:e115849.
6. Bakhshaei MH, Manuchehrian N, Khoshraftar E, Mohamadipour-Anvary H, Sanatkarfar M. Analgesic effects of intrathecal sufentanil added to lidocaine 5% in elective cesarean section. Acta Med Iran 2010;48:380-4.
7. Khan ZH, Samadi S, Ameli S, Emir Alavi C. Lidocaine as an Induction Agent for Intracranial Aneurysm Surgery: A Case Series. Anesth Pain Med 2016;6:e33250.
8. Paula-Garcia WN, Oliveira-Paula GH, de Boer HD, Garcia LV. Lidocaine combined with magnesium sulfate preserved hemodynamic stability during general anesthesia without prolonging neuromuscular blockade: a randomized, double-blind, controlled trial. BMC Anesthesiol 2021;21:91.
9. Raisis AL, Leece EA, Platt SR, Adams VJ, Corletto F, Brearley J. Evaluation of an anaesthetic technique used in dogs undergoing craniectomy for tumour resection. Vet Anaesth Analg 2007;34:171-80.