



THE WINN FELINE FOUNDATION

For the Health and Well-Being of All Cats

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Use of intravenous lidocaine for analgesia in cats

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In an article that appeared in the *American Journal of Veterinary Research* in January 2006, Bruno H. Pypendop, DMV, DVS, and colleagues published the results of their Winn-supported study into the usefulness of IV-administered lidocaine for pain management in cats.

Drug options for the provision of analgesia in cats are limited. Although effective, opioids, especially in high doses, can produce undesirable effects. Most NSAIDs (non-steroidal anti-inflammatory drugs) are metabolized poorly by cats, who seem to be especially sensitive to the toxic effects of these drugs. Lidocaine, a local anesthetic, has been reported to provide analgesia in various painful conditions in several species, including humans, rats, horses, and rabbits. This study's goal was to provide some data on the possible clinical use of IV-administered lidocaine as a systemic analgesic in cats. By determining the effects of six plasma lidocaine concentrations on the thermal threshold in conscious cats as compared with the effect of a control treatment (equivalent volume of saline solution), the researchers planned to assess the effectiveness of lidocaine. The hypothesis of the study was that lidocaine would increase the thermal threshold in a dose-dependent manner in cats.

Six healthy, domestic shorthair cats were used in the study that consisted of two experiments. Experiment 1 determined the lidocaine pharmacokinetics for each cat. In experiment 2, the resulting values were used to calculate appropriate doses of lidocaine to achieve predetermined plasma lidocaine concentrations in the cats, and then the thermal threshold was evaluated at each concentration.

Each cat wore a pressure cuff containing a temperature sensor and a heat probe that would deliver a controlled source of heat. The probe was placed over a patch of skin on the thorax that had been shaved to allow proper contact. The skin temperature was measured and then the heater was activated and the cat observed for a reaction. When a reaction was observed (jumping or turning the head toward the probe or licking or biting at the probe), the temperature was recorded and the heater turned off. This device has been successfully used in other studies to determine the analgesic effects of opioids in cats and is considered a humane research tool causing minimal discomfort. Thermal threshold was defined as the temperature at which the reaction occurred. The control cats

were injected with saline; treatment with saline solution or lidocaine was assigned in a randomized crossover design. Unfortunately, the results of the study showed that the plasma lidocaine concentrations used in this study did not affect the thermal threshold of cats.

In other studies in various species, lidocaine has provided relief from pain associated with injury, chronic headache, cancer, and burns as well as relief from visceral and neuropathic pain. Some studies have shown no significant increase in thermal threshold, but instead an effect on other pain modalities such as mechanical pain. In a study with horses involving the same method used in this study, plasma lidocaine concentrations lower than those used here provided significant increases in thermal threshold. The researchers concluded that the effects of systemically administered lidocaine on thermal pain are variable and species-specific. The selection of thermal threshold determination alone may not have been optimal for investigation of possible analgesic effects of this drug in cats. Further studies involving different types of pain are warranted to assess whether lidocaine could be a useful analgesic in cats.

References:

Pypendop, B. H., J. E. Ilkiw, et al. (2006). Effects of intravenous administration of lidocaine on the thermal threshold in cats. *Am J Vet Res* 67(1): 16-20.