

Assessment of the Electrical, Mechanical, and Thermal Nociceptive Thresholds for Stimulation and Pain Measurements at the Bovine Hind Limb

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Abstract : Background: Three nociceptive thresholds of thermal, electrical, and mechanical thresholds commonly use to evaluate the local anesthesia in many species, for instance, cow, horse, cat, dog, rabbit, and so on. Due to the lack of investigations to evaluate and/or validate such those nociceptive thresholds, our plan was the comparison of two-foot local anesthesia methods of Intravenous Regional Anesthesia (IVRA) and our modified four-point Nerve Block Anesthesia (NBA). Materials and Methods: Eight healthy nonpregnant nondairy Holstein Frisian cows in a cross-over study design were selected for this study. All cows divided into two different groups to receive two local anesthesia techniques of IVRA and our modified four-point NBA. Three thermal, electrical, and mechanical force and pinpricks were applied to evaluate the quality of local anesthesia methods before and after local anesthesia application. Results: The statistical evaluation demonstrated that our four-point NBA has a qualification to select as a standard foot local anesthesia. However, the recorded results of our study revealed no significant difference between two groups of local anesthesia techniques of IVRA and modified four-point NBA related to quality and duration of anesthesia stimulated by electrical, mechanical and thermal nociceptive stimuli. Conclusion and discussion: All three nociceptive threshold stimuli of electrical, mechanical and heat nociceptive thresholds can be applied to measure and evaluate the efficacy of foot local anesthesia of dairy cows. However, our study revealed no superiority of those three nociceptive methods to evaluate the duration and quality of bovine foot local anesthesia methods. Veterinarians to investigate the duration and quality of their selected anesthesia method can use any of those heat, mechanical, and electrical methods.

Keywords : mechanical, thermal, electrical threshold, IVRA, NBA, hind limb, dairy cow

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