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## Pain in the bud: Comparing lidocaine, bupivacaine, and liposomal bupivacaine for onset and duration in calves

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**Abstract**

This paper aims to describe the use of anesthetics for pain mitigation for disbudding in dairy calves by comparing onset and duration of three drugs. Disbudding removes the innervated tissue surrounding the bud to prevent horn growth. Currently it is not common practice to use any form of anesthetic for this procedure even though disbudding is a painful procedure. This pilot study's aim was to compare onset and duration for lidocaine, bupivacaine, and liposomal bupivacaine. Calves administered liposomal bupivacaine will have a longer period of nociception desensitization around the horn bud. Liposomal bupivacaine has been shown to provide extended anesthetic effects compared to bupivacaine while having a better safety profile. Calves from the Iowa State Dairy farm were used. The drugs were administered via the Cornual nerve. The control calf was given 60 ml of lidocaine. The second calf received 15 mg of bupivacaine. The final calf received a similar volume of liposomal bupivacaine. These injections were administered to both horn buds. Pin prick testing was done until the calf was desensitized and did not experience a withdrawal response. After onset was determined, pin prick and pressure algometer values were recorded every hour for 12 hours or until the calf was sensitive to the pin prick. If the calf was still desensitized after the 12-hour mark, further testing was done until sensitization returned. One cohort of calves was tested prior to the COVID-19 outbreak and the study will resume once quarantine restrictions have been lifted.