INTRODUCTION

The practice of disbudding is known to cause pain and distress in calves, which can lead to reduced intake of feed and weight gain. Although there are no FDA-approved pharmaceuticals to alleviate the pain and distress in cattle, one common method used to reduce pain from disbudding is a cornual nerve block with the local anesthetic Lidocaine. The effects of Lidocaine, however, have been found to last for only 60-90 minutes following disbudding. Because the pain associated with disbudding and inflammation persist longer than 60-90 minutes, a longer term method of providing pain relief is needed to improve the well-being of calves that are disbudded. Neurolysis is the intentional destruction of specific nerves and is currently used as a form of anesthesia in humans with conditions causing chronic pain. When alcohol neurolysis is used as a form of anesthesia, 93% of patients had instant pain relief and 72% of patients had 3 years of relief with a single injection that could have lasted in upwards of 6 years or more. The combination of rapid onset and long-term anesthesia makes alcohol neurolysis a potential new method for alleviating pain associated with the disbudding of calves.

METHODS & MATERIALS

A total of 16 Holstein bull calves ranging in age from 1 to 6 weeks of age were used for 2 week duration of the study. Calves were ranked according to age and systematically assigned to one of 4 anesthesia treatments (n=4).

1. 0.9% saline (SAL; 5 ml per horn bud)
2. 2% Lidocaine (LID; 5 ml per horn bud)
3. 75% Ethyl Alcohol (ALC; 5 ml per horn bud)
4. 2% Lidocaine (2.5 ml) + 75% Ethyl Alcohol (2.5 ml) (MIX; 5 ml per horn bud)

Assessment of Nerve Block
1. Prick Test
   - Needle prick area surrounding each horn bud on each horn bud
   - Tested at 12, 3, 6, & 9 o’clock locations
   - Applied at 5, 10, 15, 20, 30, 60 min. on day 1, and once daily from days 2 to 14
   - Performed by the same blinded observer once daily for two weeks or until the horn became sensitive

2. Behavior Assessment
   - Evaluation of behavioral response to prick test
     - “Blocked” defined as no movement in response to prick test
     - “Not Blocked” defined as: Pulling on halter, Throwing head back, Backing away from handler, Falling down
   - Observation
     - Live observations for 2 weeks following treatment and video recordings were used to assess response to prick test
     - 15 Animal Management Students assessed the videos for responses of the calves on the first day of evaluation
     - A Veterinarian assessed the videos and did live observations from day 2 to 14.
     - Once a horn bud scored as sensitive (not blocked), no further tests were performed for that horn bud
     - Each horn bud was observed independently
   - Proc Mixed procedures in SAS were used for analysis

RESULTS

The preliminary data from this pilot study shows that ethyl alcohol could be a viable cornual nerve block for reducing pain at the horn buds when disbudding calves instantaneously and over 14 days. Although behavior alone was assessed in this pilot study, more comprehensive research is needed to effectively evaluate ethyl alcohol as a cornual nerve block. Future research needs include monitoring pain associated behaviors during and following the disbudding of calves, addition to an evaluation of blood cortisol concentrations, health, and performance of disbudded calves.

DISCUSSION

In order for producers to effectively and safely manage their herd, practices such as dehorning are necessary for the well-being of workers and animals, but more work is needed to improve the pain relief from this practice. The preliminary data of the present study shows that ethyl alcohol could be a viable cornual nerve block for reducing pain at the horn buds when disbudding calves instantaneously and over 14 days. Although behavior alone was assessed in this pilot study, more comprehensive research is needed to effectively evaluate ethyl alcohol as a cornual nerve block. Future research needs include monitoring pain associated behaviors during and following the disbudding of calves, in addition to an evaluation of blood cortisol concentrations, health, and performance of disbudded calves.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the Research Advisory Council within the Oklahoma State University Center for Veterinary Health Sciences and OK-LSAMP for their funding and contributions to the project. The authors would also like to thank the Oklahoma State University Dairy for their contributions to the project.