

Practical Pain Management on Dairies

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Introduction

Disbudding occurs on a large proportion of dairy farms. This practice has been associated with pain and activation of the neuroendocrine system. Both the AVMA and AABP recommend disbudding as early as possible in conjunction with pain mitigation drugs. New standards in the 4th Version of the FARM Animal Care Program have made these practices mandatory for participating dairies. Disbudding can be accomplished by either cauterization methods (hot-irons); or the use of caustic pastes (eg. Dr. Naylor® Dehorning Paste). Both methods have been shown to cause pain, discomfort, and activation of the neuroendocrine system. Using a local anesthetic block combined with a non-steroidal anti-inflammatory drug (NSAID) provides optimum pain relief following the procedure.

Drugs for pain mitigation

****The listing of analgesic drug options presented here are by prescription only. Each individual facility will have to work with the veterinarian on record to obtain these medications; and to develop protocols for use as prescribed under their VCPR.****

Dehorning stress reduction

Disbudding has been shown to be a stressor to calves. Measures of the calf's immune system have shown that disbudding increases white blood cell numbers and lowers their reaction to inflammation. Providing analgesia in the forms of a local anesthetic block and NSAID attenuate these changes. Furthermore, it is recommended that disbudding not occur at times of stress such as transport and /or weaning as these stresses can be additive leading to increased risk of illness.

Local anesthetics

Local anesthetics function by blocking sodium channels within the nerve cells preventing the conduction and transmission of the pain signal. Blocking the nerve transmission to a region desensitizes the region, and prevents the pain sensation caused by heat or chemical burn of caustic pastes from being felt. Lidocaine is the most common local anesthetic used on farms, and will be the only medication discussed in this section. Lidocaine has a rapid onset of action and provides approximately 90 minutes of desensitization. Local anesthetic block using lidocaine is effective, inexpensive and safe. For cauterization disbudding, allowing 5-10 minutes between lidocaine injection and the dehorning procedure will ensure the drug has had time to take effect. For producers that prefer caustic paste disbudding, lidocaine can be administered at the time of paste application. The use of lidocaine makes the task of disbudding easier for the calf and farm staff performing the procedure.

The cornual nerve provides innervation to the horn-bud region. The horn-bud and surrounding region can be desensitized by injecting 4-5 mL of lidocaine along the cornual nerve. Local anesthetic block of the cornual nerve can be easily performed using anatomic landmarks on the calf's head. The cornual nerve lies under the frontal ridge, which is a bony structure of the skull that travels between the eye and horn (**Fig. 1**). It can be readily palpated by passing a finger between the eye and horn. Placement of the lidocaine injection half-way between the eye and horn; and under the frontal ridge is the desired target for placement of a local anesthetic block. **Figure 2** provides step-by-step procedures to properly perform local anesthetic block of the cornual nerve for disbudding. It is recommended to work with your veterinarian for training on how to perform this quick, easy, and important technique.

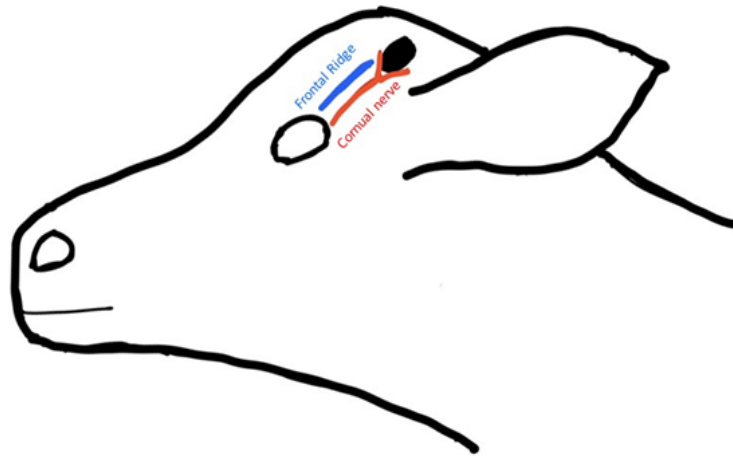


Figure 1. Anatomic location of the cornual nerve (red) and frontal ridge (blue)

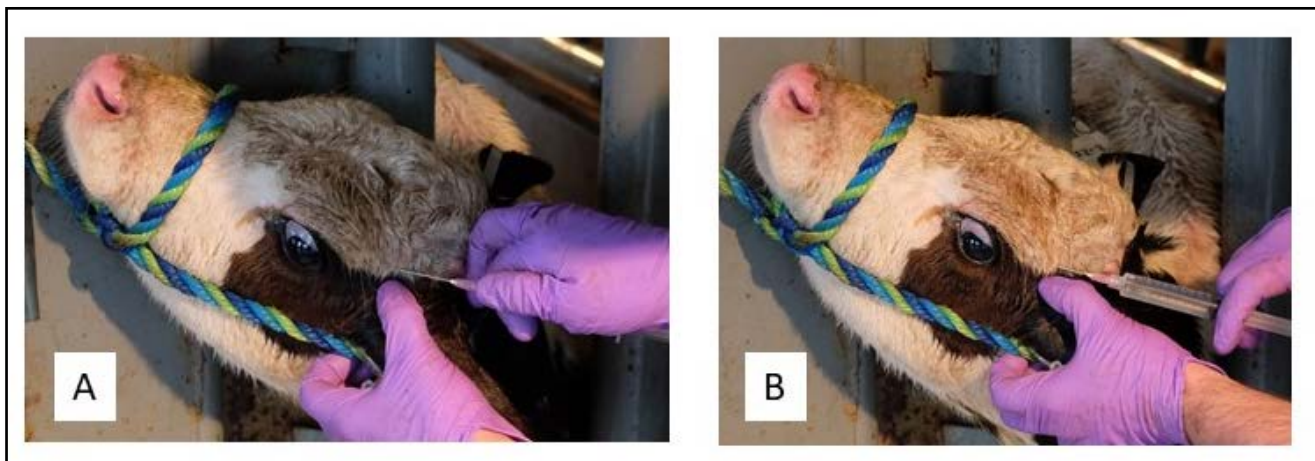


Figure 2. Steps for providing local anesthetic for disbudding using a cornual nerve block. (A) Palpation of the temporal ridge and insertion of the needle below the ridge; (B) Inject 5 mL of lidocaine into the area.

Non-Steroidal Anti-inflammatory drugs

Non-steroidal anti-inflammatory drugs (NSAIDs) are an attractive option for pain management as they are relatively safe, have a relatively long duration of action, and do not cause sedation in calves. Currently, there are no FDA approved NSAIDs labelled for disbudding pain control. The use of NSAIDs for disbudding pain control are considered an extra-label drug use (ELDU), and can be used under AMDUCA with a valid VCPR (required by the FARM Program). Even though there are no approved

NSAID options, there has been a large body of research work that supports their use for both cautery (hot-iron) and caustic paste disbudding. Additionally, NSAIDs and local anesthetic blocks work synergistically in providing analgesia to calves.

Flunixin and meloxicam are the only two NSAIDs that will be discussed for disbudding analgesia at this time. Both have a substantial body of research supporting their use along with information to comply with AMDUCA. The duration of action, ease of use, and costs associated with each drug differs.

Flunixin

Flunixin is a NSAID with FDA approval in the United States and is available in an injectable or transdermal formulation. The injectable formulation is labeled for intravenous injection only for treatment and control of pyrexia (fever) and endotoxemia. Giving injectable flunixin by intramuscular (IM) or subcutaneous (SQ) injection has been proven to be painful and cause significant tissue damage. Due to its short-lived analgesic effects and the need for intravenous injection, it is not recommended as a disbudding analgesic.

Transdermal flunixin is designed as a topical pour-on medication and is FDA approved for foot rot pain control. Transdermal flunixin is rapidly absorbed across the skin and has anti-inflammatory effects that last for 30-48 hours. Following cauterizing dehorning, transdermal flunixin lowered cortisol concentrations and improved central sensitization. Transdermal flunixin is recommended to be used at the label dose of 3 mL per 100 pounds, poured along the top-line.



Meloxicam

Meloxicam is a NSAID with approvals for pain control at disbudding in Canada and European Union. Under AMDUCA regulations oral meloxicam can be prescribed under a valid VCPR for pain control at disbudding. Human meloxicam tablets are typically prescribed as they

are relatively inexpensive and can be administered orally. Meloxicam tablets are readily absorbed by cattle of all ages including pre-weaned calves. Research supports meloxicam use for disbudding analgesia. Meloxicam has been shown to increase mechanical nociception threshold measures when given at the time of dehorning indicating increased tolerance to painful stimuli. Meloxicam has also been shown to lower cortisol and substance P (a biomarker for pain) in calves following disbudding. The recommended dose for meloxicam is 1 mg/kg. This translates into using three 15 mg tablets of the human generic per 100 pounds body weight. It is advised to work with your veterinarian on dosing strategies. This will ensure proper dosing as well as employee compliance.



Take-Home Messages

- Disbud only healthy calves
- Avoid disbudding at the time of other stresses such as weaning or moving
- Implement the use of local anesthetic blocks and other pain relieving medications
- Work with your veterinarian to develop protocols and SOP's to ensure every calf benefits from proper drug administration and timing
- Ensure employees are comfortable and trained in performing disbudding task.