

Beat the Hurt

Cattle producers have cost-effective options to manage cattle pain.

by **Heather Smith Thomas**

Cattle producers continually improve how they handle, manage and care for cattle but the dearth of FDA-approved products limits their ability to manage cattle pain.

Hans Coetzee, head of the department of anatomy and physiology at the Kansas State University College of Veterinary Medicine, has been working with food animal pain management for 15 years.

“One drug, marketed as Banamine Transdermal, was approved in 2017,” Coetzee says. “Although it is very effective, it is only labeled for pain associated with foot rot in beef cattle and non-lactating dairy cattle. We remain limited in our ability to provide pain management for other painful conditions such as castration and dehorning.”

Drug labels can make it challenging for producers to provide food animals pain management.

“Currently, because there are no specific approvals for managing pain, producers can use a drug in an extra-label manner,” Coetzee says. “This means that they are using a drug that’s not specifically labeled for a certain purpose, but it can be prescribed by their veterinarian.”

Extra-label drug use (ELDU) is governed by the Animal Medicinal Drug Use Clarification Act (AMDUCA). This allows for extra-label use of drugs under direction of a prescription by a veterinarian — specifically in situations where there are no other drugs approved for that purpose and the animal’s health is threatened or the animal is suffering.

“This legislation provides a framework for producers to work with their veterinarians to provide pain management in food animals for conditions where no drug approvals currently exist,” Coetzee says.

Veterinarians can prescribe these drugs, making them responsible for ensuring the animals receiving an extra-labeled drug do not pose a risk to the consumer in terms of drug residue in the meat or milk.

“For ELDU to occur, the veterinarian has to provide the producer with a withdrawal-period recommendation,” Coetzee says.

Use of a drug extra-label depends on a valid veterinarian-client-patient relationship (VCPR) and an understanding about how the drug is to be used. This includes administration method, dosage and withdrawal period.

“Across our industry, we increasingly recognize the importance of the VCPR to provide the regulatory foundation for the practitioner to work with the producer to provide feed medications under the Veterinary Feed Directive (VFD) and also to provide medications for extra-label use when considered necessary,” Coetzee explains.

Animals can benefit from pain relief and be marketed without risk of tissue residues.

A potential solution

Meloxicam, a non-steroidal anti-inflammatory medication for human arthritis, was approved in Canada several years ago for use in food animals in that nation. However, the drug has not yet been approved for food animal use in the U.S. ELDU of human generic meloxicam tablets can legally occur in food animals to relieve pain if there are no FDA-approved drugs specifically labeled for this purpose. Extra-label use must not result in tissue or milk residues that would pose risks for humans.

Public concern about farm animal welfare has led to increased awareness of discomfort caused by routine husbandry practices. These concerns also foster more research aimed at understanding pain in livestock and how to best alleviate it.

Meloxicam has been shown to effectively alleviate pain during dehorning and castration and has several advantages compared to other methods of pain management. These advantages include a longer period of pain relief with a single dose, ease of administration and cost effectiveness. A veterinarian can prescribe meloxicam to alleviate pain and stress, and enhance animal wellbeing following dehorning and castration.

Meloxicam has a 27-hour half-life, compared to other pain medications only lasting a few minutes. The cost of the drug is usually less than \$1 per calf at branding. The FDA asks your veterinarian to assign a withdrawal time; 21 days is usually considered appropriate. Meloxicam comes in 15-milligram (mg) tablets, which are slightly smaller than an aspirin. Cattle dosage is 45 mgs per 100 pounds.

“Oral meloxicam tablets are a relatively inexpensive way to provide pain relief in cattle, provided this is done under the direction of a veterinarian and in compliance with AMDUCA,” Coetzee says. “A potential challenge for the producer, however, is how to deliver the drug.”

“Meloxicam comes in small tablets intended for humans. Most producers prefer either a large oral bolus, an oral liquid suspension, an injection or a topical administration for a drug.”

A challenge pharmaceutical companies face while gaining approval for pain relief drugs in the U.S. is the FDA’s requirement for drug companies to use a validated method of pain assessment in the animal. It’s difficult to find methods that satisfy the FDA’s pain measurement requirement.

“There have been several attempts at developing pain scoring systems in food animals, but one of the challenges with those has been to validate them in a way that they can be used objectively by the drug company or the producer, to confirm that the animal is in pain and that the drug is actually working,” Coetzee says.

One of the tools currently used to measure pain is an assessment of the animal’s gait using a pressure mat.

“Pressure mats detect changes in force, surface area, stride length and pressure on each foot when the animal walks over it,” Coetzee says. “Each footfall can be visualized, and specialized software can

Dehorning

Dehorning cattle when they are young and their horn buds are small is typically not an issue, but dehorning when horns are large can be very painful and stressful for the animal.

“If larger animals must be dehorned, we recommend using both a local anesthetic and a longer-acting non-steroidal anti-inflammatory drug that will reduce pain associated with subsequent inflammation,” says Hans Coetzee, head of the department of anatomy and physiology at the Kansas State University College of Veterinary Medicine.

Pain management targeting different parts of the pain pathway is referred to as multimodal analgesia.

“We’ve seen dramatic behavioral changes in animals that have received this multimodal pain management, especially in older calves and those that undergo multiple painful procedures such as dehorning and castration at the same time,” Coetzee says. “If you can help that animal feel better for at least a day or two after the procedure, you can reduce the impact of those procedures on health and welfare of the animal.”

It is more beneficial for the animal to receive a local painkiller along with a long-acting drug. This combination minimizes initial pain and helps keep the inflammatory pain under control.

“We are more successful in controlling pain if we can give the analgesic drug before the procedure,” Coetzee says. “However, giving it at the time of the procedure is better than not giving it at all. If you provide pain management a day or two after the onset of pain, the pain management drug will not be as effective as if we gave it at the time of the procedure.”

Just like humans, in order to prevent pain, you have to stay on top of treatment.

“This is the key,” Coetzee says. “When we perform painful management procedures, we have the opportunity to give the drug before the pain actually starts. This is similar to what you would receive when going to the dentist.

“Lidocaine is often used when dehorning, and we can add bicarbonate as a buffer. We add 1 cc (cubic centimeter, which is equal to 1 milliliter) of bicarbonate to 10 cc of lidocaine. To keep the lidocaine stable in the bottle, it is formulated as an acid. Injecting it can actually be painful; it stings. Adding bicarbonate is a trick we learned from human medicine. The dentist generally buffers the lidocaine to prevent that sting when it is injected into a human patient. We believe it’s also beneficial for animals to not have to deal with that initial stinging pain associated with the injection.”

Coetzee explains veterinarians have learned much about pain management in food animals from human medicine.

“We are restricted, however, by cost considerations since economics is part of our production systems. We have to make sure that the interventions we adopt are cost-effective so producers can utilize these strategies in their operations,” he says. **HW**

be used to characterize the animal's gait before and after a painful procedure. Conditions that cause pain, such as lameness and castration, result in changes in the way an animal walks — that can be detected and measured using the pressure mat.”

These measurements can track changes to food animals' pain.

“The pressure mat can be used as a validated method of pain assessment to determine whether a drug is working or not,” Coetzee says. “This technique was the basis for the approval of Banamine Transdermal because the company was able to show that in cases of foot rot, the animals that received the pain relief drug applied more force on the affected foot — walking more normal.

“Kinematic gait analysis provides an accepted platform for pharmaceutical companies to be able to get drugs approved. The challenge now would be whether the pharmaceutical industry will perceive that this is a segment of the industry that would provide them with a return on their investment.”

Public perception of the cattle industry

One driver for the use of pain medication is negative consumer perceptions of some livestock management practices.

“Pain mitigation may become something consumers expect livestock producers to do, to ensure that the wellbeing of the animal is not threatened,” Coetzee says. “In these situations, pain management may become a cost of doing business. However, this should not be viewed as a threat. Livestock producers already do an outstanding job of taking care of their animals.

“With this goal in mind, I believe that providing pain management can be a win-win for the animal and the producer. When we start administering pain management, the cattle look better after painful procedures. They are typically up eating, and their behavior is similar to what we see before the procedure.”

Coetzee encourages producers to talk with their veterinarians about pain management.

“If producers can try some of these methods and see how the treated animals respond, they could get a sense of whether this is something that might work within their production system,” Coetzee says. “A conversation with their veterinarian could help address some of the concerns the producer may have. I don't think it's a case anymore of pain management being too expensive or not worth pursuing, since most livestock producers want to do the best they can for the animals in their care. This is just one component of sustainable management of livestock.” **HW**

Editor's Note: Heather Smith Thomas and her husband, Lynn, have ranched near Salmon, Idaho, for more than four decades. She also writes cattle articles that appear in numerous U.S. and Canadian cattle publications, including *Hereford World*. She is the author of numerous books, including “The Cattle Health Handbook.”

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