

Calf Dehorning

by Melissa Drew

Introduction

Calf dehorning is a common husbandry practice used to reduce the risk of injury to herdsmates and stockpersons and to make handling of confined animals less dangerous. This procedure can be carried out using several methods - heat cauterisation, caustic paste, scoop dehorning - and is usually performed without anaesthesia, hence posing serious welfare concerns. All methods of dehorning are invasive, involve tissue destruction, and appear to cause significant stress and pain in the calves. Research into methods of reducing these negative experiences is therefore of importance in improving calf welfare. Recent studies (Graf & Senn, 1999; McMeekan et al, 1999) have used behavioural and physiological parameters to demonstrate the stressful and painful nature of dehorning, and have investigated the effectiveness of local anaesthesia in ameliorating such stress. A further option in improving calf welfare, as investigated by Goonewardene et al (1999), is breeding for polledness, thereby eliminating the need for dehorning.

Discussion

Graf and Senn (1999) studied the physiological and behavioural responses of calves to cauteric dehorning in order to assess the level of stress and pain experienced, and to examine the alleviating effect of a local anaesthetic. Calves aged 4-6 weeks were allocated to one of three treatment groups: Dehorning after injection of a local anaesthetic (lidocaine - A group), dehorning after administration of a local saline injection (S group) and dehorning without any injection (C group). Two days prior to dehorning, all treatment groups were subjected to a simulated dehorning followed by observation. This enabled separation of handling-induced responses from dehorning-induced responses. All experiments were started at the same time of day to prevent confounding through circadian fluctuation in levels of the hormones studied (cortisol, ACTH and vasopressin).

Compared to simulation and to the A group, dehorning of S and C calves resulted in significantly increased frequencies of tail wagging, head moving, tripping and rearing. In the 4 hours post-dehorning, S and C calves showed more frequent abnormal backward locomotion and head shaking, avoided head pushing against penmates and showed clearly reduced feeding behaviour when compared with simulation. Significantly fewer abnormal behaviours were observed in the A calves. Simulated dehorning had no significant effect on the concentrations of the three hormones in any group, however following dehorning the plasma concentrations of all three increased significantly in S and C calves compared with A calves. A small increase in cortisol concentration occurred in the A group compared with the S and C groups two hours after dehorning, most likely the result of the anaesthetic wearing off.

Together, the behavioural and physiological responses of the calves in this study indicate that dehorning calves by heat cauterisation causes considerable pain and stress. Abnormal movements and postures and decreased food intake are considered to characterise an animal in pain, while behaviours such as rearing and tripping are strong signs of avoidance and escape. This is supported by the increased levels of cortisol, ACTH and vasopressin, which are released in response to various stressors. The conclusion reached by the authors, that dehorning causes stress and pain which can be alleviated for up to 2 hours post-dehorning by local anaesthesia, is a valid one. Calves dehorned without anaesthesia tended to demonstrate higher frequencies of avoidance behaviour, suggesting that the extra restraint used on these animals to keep them still may have exacerbated the stress experienced. By reducing the painfulness of the procedure, the use of local anaesthetic therefore also reduces the stress experienced by removing the need for more forceful handling. The apparent waning of the anaesthetic effect after two hours suggests that further studies are required to investigate subsequent pain relief. This subject was investigated by the next authors, McMeekan et al (1999).

The aims of the study by Mc Meekan et al (1999) were to identify the behaviours stimulated by dehorning and to use these to evaluate the effects of using a local anaesthetic and a non-steroidal anti-inflammatory drug (NSAID) to alleviate the distress caused. Three to four month old calves were randomly allocated to one of seven treatments. These were: (1) Control - horn buds massaged; (2) Lignocaine control - local anaesthetic injected prior to having horn buds massaged; (3) Ketoprofen control - an NSAID injected into the jugular vein prior to horn bud massage; (4) Scoop dehorning; (5) Dehorning + lignocaine; (6) Dehorning + ketoprofen; (7) Dehorning + lignocaine + ketoprofen. Behavioural observations were made at 2, 4 and 6 hours after treatment, then for 4 hours each on the following 2 days. The results of this study found that calves dehorned without anaesthetic or analgesia demonstrated significantly more lying, tail shaking and ear flicking, and significantly less grazing and ruminating behaviour during the first 4-6 hours than those that were not dehorned (treatments 1-3). The behaviour of calves dehorned following administration of both a local anaesthetic and an NSAID was similar to control calves, while those calves given only analgesia before dehorning showed similar behaviour to calves dehorned without any pain relief. Those calves given only an anaesthetic prior to dehorning showed behaviours between the two extremes.

These results suggest that dual administration of a local anaesthetic and an anti-inflammatory drug is an effective way of alleviating scoop dehorning pain in calves. However as the behaviours of all calves were similar by 6 hours after dehorning, the authors suggest that these agents reduced the pain experienced for at least 4 hours, but did not eliminate it. In addition, since observations began 2 hours after dehorning, the immediate effects of the anaesthetic and analgesia would have been missed. This suggests the need for further studies, in particular investigation of the use of longer acting analgesics.

While the use of anaesthesia and analgesia is a positive step in calf welfare, a considerably more calf-friendly alternative is breeding for polledness and hence removal of the need for dehorning. Few breeds are currently polled as there is a perception among some breeders that horned cattle are superior to polled in traits associated with reproduction, growth and behaviour, and only a limited number of studies have been done to disprove this belief. A study by Goonewardene et al (1999) compared the behavioural responses of genetically horned and polled calves to frequent handling, use of an electric prod, and retainment in a head gate. The aim of this was to establish the phenotypic similarity between horned and polled cattle in behavioural traits, evidence which could then be used to support the recommendation of breeding for polledness. The behaviour of weaned calves (dehorned and polled) was measured for the three management treatments, in terms of Maximum Force Scores (MFS - forcefulness of stimulus required to move cattle forward in the chute) and Transit Time (TT - time taken in seconds for the calf to move the length of the chute). Treatments were carried out on reaching the squeeze. No significant differences between dehorned and polled cattle were observed for either overall MFS or TT, indicating that the overall behavioural responses of phenotypically dehorned and polled cattle are similar for the management practices studied. Although calves tended to react negatively to all three treatments, this behaviour was common to both dehorned and polled animals. The authors concluded that breeding for polledness is a simple, welfare friendly and non-invasive method of progressively eliminating horns in cattle. This conclusion appears valid, since the polled allele is dominant in *Bos taurus* cattle (Long & Gregory, 1978).

Conclusions

Studies into the use of local anaesthesia and anti-inflammatory drugs at dehorning have furthered calf welfare by demonstrating that these agents act to alleviate the trauma associated with this procedure. Although measurement of pain and stress in animals is difficult, generally accepted physiological and behavioural indicators of these experiences can be used to support such conclusions. The necessity to subject calves to dehorning may be avoided, however, through breeding for polledness. As this is the most favourable option for calf welfare, further studies are required to establish its plausibility.

References

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