Developments in the recognition, measurement and alleviation of pain in cattle

By Michael Healy

Introduction

Although we cannot directly investigate the emotional states of animals, Flecknell (2000) asserts that animals do experience pain, an interpretation in the central nervous system of noxious stimuli. The infliction of pain on animals is an emotive and important animal-welfare issue (Stafford & Mellor, 2005a). Causes of pain in cattle include injury and disease, veterinary surgery and routine procedures, such as castration and dehorning. This paper will discuss recent developments in our understanding of the assessment and alleviation of pain in cattle, and overall implications of recent findings for cattle welfare.

Discussion

Identification and measurement of pain in cattle is crucial to enhancing our understanding of pain and taking steps to alleviate it. However, this is a challenge, because cattle have evolved as prey animals and so may mask behavioural signs of pain so as not to display weakness (Huxley & Whay, 2006). Weary *et al*. (2006) discuss key concepts and methods for assessing and preventing animal pain. They outline three approaches to pain assessment: measures of body functioning, physiological responses and behavioural responses. Subjective measures of pain, although prone to lower reliability than objective measures, are nevertheless useful (Weary *et al*., 2006).

Castrating calves is believed to cause pain. A study by Thuer *et al*. (2007) aimed to compare castrating calves by Burdizzo and by rubber ring, in terms of short- and long-term pain responses. The efficacy of local anaesthesia to reduce post-castration pain was also tested. Changes in plasma cortisol concentrations and in behaviour post-castration were measured. Weary *et al*. (2006) state that optimal measurement of pain differentiates between painful and control (non-painful) states, both with and without analgesia. The design of the study by Thuer *et al*. (2007) embraced this approach by assessing physiological and behavioural indicators of pain in three groups of calves (Burdizzo, rubber ring and control), with and without local anaesthetic applied to the scrotum. The plasma cortisol response to castration was initially greatest in the Burdizzo group, but lasted longer in the ring group. Local anaesthesia significantly reduced signs of pain in both castrated groups. Calves castrated by rubber ring, whether anaesthetised or not, showed behavioural signs of chronic pain. They responded to scrotal palpation for eight weeks and had a high proportion of abnormal postures for three months. The subjective assessments of behaviour in this study used scoring systems with unambiguous, clearly defined categories. This improves reliability (Weary *et al*., 2006) and enables further research using the same methods of assessment.

Within the veterinary profession, opinions vary on how cattle ‘experience’ pain. This has implications for the appropriate administration of analgesia. By means of a questionnaire, Huxley & Whay (2006) set out to determine the attitudes and views of UK cattle practitioners to pain in cattle. Respondents were asked for their background demographic information, to list their choice of analgesia for certain conditions and procedures, and to score (on a scale from zero to ten) the severity of pain for cattle undergoing certain procedures or presenting with certain conditions. On average, females and more recent graduates gave significantly higher pain scores, while those who did not administer analgesics routinely gave significantly lower pain scores (Huxley & Whay, 2006). Such wide variation in the perception of pain means that subjective measures of pain must use clearly defined scoring systems, as described by Thuer *et al*. (2007), to increase consistency among observers. Sixty-five per cent of respondents stated that they had gained most of their knowledge of pain in cattle by ‘self-learning’ (Huxley & Whay, 2006). Thus, individuals may disagree with peers and current scientific thinking on their perception of pain. More effort is necessary to distribute current knowledge and ensure that appropriate analgesia is given to cattle. Huxley & Whay (2006)

were unsure whether respondents were representative of the entire cattle profession, so possible bias may limit the significance of the study's results.

Recent studies have implications for improvements in animal welfare. Recognition that cattle experience pain means producers and veterinarians are obligated to minimise that pain. The discussion by Weary *et al*. (2006) highlights the importance of effective pain measurement, and the need to develop simple, repeatable techniques for objective and subjective pain assessment. Thuer *et al*. (2007) recommend local anaesthetic to reduce acute pain in both castration methods studied. The authors recommend Burdizzo castration as it produced no signs of chronic pain. The use of rubber rings of the same size used in lambs (which have less scrotal tissue) may contribute to chronic pain after ring castration (Thuer *et al*., 2007). Rings designed for use in calves may enhance the welfare of calves castrated in this manner. Huxley & Whay (2006) found that veterinarians scored Burdizzo castration as more painful than ring castration. However, because veterinarians often do not see calves in the weeks following castration, they may not appreciate possible chronic pain caused. Perhaps if they did observe castrated calves during this time, they would concur with Thuer *et al*. (2007) that rubber rings are a more painful method. Stafford (2007) calls for research into chronic pain in cattle, as current understanding is limited – do calves castrated by rings feel ongoing pain or merely irritation? Which behavioural changes are indicative of chronic pain? If research finds that chronic pain is severe, methods to alleviate it should be developed to improve cattle welfare. It should be noted, however, that use of analgesia is determined not only by welfare considerations, but also by cost, practicality and ease of administration (Stafford & Mellor, 2005b).

Conclusion

Recent studies on the assessment and alleviation of pain in cattle enhance our understanding of how analgesia can best be used to improve cattle welfare. Future research into chronic pain is warranted, and use of subjective measurements in this research should involve unambiguous scoring systems to increase their reliability.
Based on the findings of Thuer *et al*. (2007), Burdizzo with local anaesthesia is the recommended method of castration. Improved dissemination of current knowledge to cattle veterinarians may enhance understanding of issues of pain and analgesia.

References

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