

Lamb welfare in relation to castration and docking

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Introduction

Acute pain and distress of lambs during and following castration and tail docking has been an issue of much study over the past decade. These operations are routinely performed on lambs at less than one week of age, either surgically or using an elastrator ring with or without a castration clamp. Anaesthetic or analgesics are generally not used, being considered uneconomical or impractical, whilst increasing handling time and thus the stress of the lambs.

Discussion

In looking at lamb welfare, various methods have been used in an attempt to quantify the pain experienced from castration and docking. Indications most commonly relied on are behavioural responses and changes in plasma cortisol concentrations. Jongman, Morris, Barnett and Hemsworth (2000) used electroencephalogram (EEG) changes, claiming this to be a more accurate measure of pain perceived, excluding to a greater extent the effects of stress on the result. EEG frequency spectral changes have been observed under experimental conditions on humans, and are thought to reflect cortical electrical activity, which is associated with cognitive perception of pain. Animals are unable to provide verbal pain reports, but Ong, Morris, O'Dwyer, Barnett, Hemsworth and Clark (1997) detected a correlation between EEG and behavioural changes of sheep in response to acute painful stimuli (a mild electric shock) and chronic pain (induced lameness). They concluded that EEG changes are a good measure of acute pain, and that the human pain model is applicable to sheep. In undertaking the study with lambs, Jongman et al (2000) recorded EEG changes for 15 minutes before, during, and for 15 minutes after surgical castration, tail docking, and mulesing. The responses were compared with EEG spectrums produced from routine, non-noxious husbandry procedures (ear tagging, shearing and handling) and from noxious treatment (lameness induced by injection of formalin into the interdigital space of the hoof). The EEG spectrum changes from this study conflicted with the results anticipated from the adult sheep pain model adopted by Ong et al. (1997). Jongman et al. (2000) suggested that the different responses might be the result of incompletely developed pain pathways in lambs. The conflict with expected results highlights the need for further research to develop this technology in pain assessment of animals of different species or different stages of life.

The strength of this study is that noxious and non-noxious controls were included, and the EEG responses from castration, docking and mulesing were found to be consistent when compared with those from the controls. Mulesing had a response similar to the noxious control both during and for the 15 minutes after treatment. At the time of treatment, castration and docking resulted in a response similar to that of the noxious control, but during the 15 minutes following, the EEG was similar to the non-noxious controls. These data suggest that there is some short-term pain associated with castration and docking, and that the pain during these two procedures is of similar magnitude. There was no evidence based on the EEGs to indicate that pain was present during the 15 minutes immediately afterwards. This is in contrast to studies based on behaviour and cortisol response, where pain appeared to last for up to 8 hours (Lester, Mellor and Ward, 1991). It may be that EEG measurements are not sensitive enough to distinguish between degrees of mild pain, or alternatively, the changes in behavioural and other physiological variables may be in response to perceptions other than pain.

To compare distress levels with different methods of castration and tailing, Mellor and Stafford (2000) designed a ranking scale based on acute changes in plasma cortisol concentrations. The techniques employed were surgery, a ring or a ring and clamp. Two methods of pain alleviation were also assessed - local anaesthetic and a systemic analgesic. In the ranking scale, rank 1 represented the least distress and rank 6 the most distress. They found that responses to most of the tailing methods were several ranks lower than those caused by

castration alone or castration plus tailing. Surgical methods of castration and/or tailing caused the greatest cortisol response, ranking at 5 or 6. The authors recommend that, for the improved welfare of the lambs, the surgical method should be discouraged. However, several researchers studying behavioural responses such as vocalisation, activity, and posture, have concluded that rings are more painful (Molony and Kent, 1993; Shutt, Fell, Connell and Bell, 1988). It is possible that unidentified extraneous stimuli may have affected either the cortisol or the behavioural responses, giving conflicting results.

Without anaesthetic or an analgesic, castration or castration plus tailing with a ring or ring plus clamp caused a rank 4 response. The exception to this was in lambs aged less than 1 week when, after ring placement, the clamp was applied for 10 seconds across the full width of the scrotum or tail. With this technique the cortisol response was reduced to rank 1. Lambs older than 1 week had no significant reduction in response with this method. Sutherland, Stafford, Mellor, Gregory, Bruce and Ward (2000) used this technique on lambs aged 3 to 6 weeks, but tested also to see if a 6 second clamp application would produce a cortisol response reduction. Cortisol concentrations were tested before and regularly for about 4 hours after treatment. The result showed no significant reduction in either the magnitude or the duration of the response in the lambs clamped for 6 seconds. In the lambs clamped for 10 seconds the magnitude of the response was marginally reduced, but only at 1 hour after treatment. The healing process of the scrotal wounds was monitored for 6 weeks following castration. More rapid healing was observed in the lambs castrated with the ring plus clamp than with just the ring. Despite this result, due to the very small reductions in cortisol response, and the extra stress on the lambs during the process, the authors do not recommend the use of the clamp with the ring in older lambs. Kent, Jackson, Molony and Hosie (2000) recorded a similar result of healing in lambs castrated and docked at less than 2 days of age. Lesions were compared between lambs on which a ring plus clamp (RC) was used and lambs on which only rings were used, with (RA) or without (RN) local anaesthetic. The lesions were monitored twice weekly for the 6 weeks following. It was observed that the tails were cast approximately 10 days earlier by RC lambs. The time taken for the scrotal lesion to reach maximum severity on RC and RA lambs was half that of the RN lambs, although the magnitude of the severity was unaffected.

In their study, Mellor and Stafford (2000) found that local anaesthetic given before or immediately after ring castration and/or tailing virtually abolished the cortisol response (rank 1), as did an analgesic (non-steroidal anti-inflammatory) in clamp castration and ring tailing. Long term effects of pain reduction during castration and docking is seen in the study by Kent et al. (2000). The behaviour of handled controls, the RA and the RN lambs, was monitored for two 3-hour periods 10, 20, 31 and 41 days after treatment. The RN lambs showed a significant increase in abnormal behaviour, with a higher mean frequency of foot stamping, tail wagging, and head turning to the scrotum and inside hind-leg. The RA lambs showed more of these behaviours than the controls, but less than the RN lambs. This was unexpected, and may be evidence of a long lasting increase in pain sensitivity in young animals after an episode of intense acute pain. If this is so, there are great benefits to using pain reduction in these procedures.

Conclusions

To determine which methods of castration and docking are best for lamb welfare further research must be conducted. The conflicting results from different studies demonstrate the need for development of a more definitive and reliable technique to evaluate pain experienced in association with husbandry practices. In looking at this issue it must be considered that in dealing with farm animals, changes in handling will only be brought about if they are economically and practically feasible.

References

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