Welfare implications of husbandry procedures for lambs in Australia

Discusses whether psychological and physiological stressors alter the acute pain response to routine husbandry procedures, such as docking and mulesing, in lambs.

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Introduction

In Australia, lambs undergo several husbandry procedures, such as vaccination, ear-notching, ear-tagging, mulesing, castration and tail-docking (C&TD). Tail-docking and mulesing reduce cutaneous myasis (flystrike) caused by *Lucilia cuprina* (Lee & Fisher, 2007), but are controversial due to the large wounds created and because they are often imposed without pain relief (Lomax *et al*., 2009). The commitment by the wool industry to phase out surgical mulesing by 2010 (Evans *et al*., 2011) has generated research into alternative methods, including selective breeding of wrinkle-free sheep, application of clips and intradermal injections to increase the bare-breech area (AWI, 2009).

Breeding of bare-breeched sheep is the most desirable option, because it eliminates the need for the removal of skin folds. Yet, results from these programs are unlikely to be available in the short term (Edwards *et al*., 2009). Current research concentrates on development and assessment of less welfare-compromising alternatives to mulesing (Evans *et al*., 2011; Edwards *et al*., 2011; Lepherd *et al*., 2011a & b; Hemsworth *et al*., 2009)., but as there is still no feasible alternative to C&TD, it is important to choose the appropriate time and environment to impose these procedures. Publications reviewed here were selected for their investigation into different aspects of pain in sheep, so we might make an informed choice on the least welfare-compromising timing (Guesgen *et al*., 2011), technique (Edwards *et al*., 2011) and working environment (Clark *et al*., 2011) for husbandry procedures.

Discussion

Stressors are factors eliciting a rise in plasma cortisol concentrations (PCC) or in inhibition and/or latency of behaviour expression (Lester *et al*., 1996; Shutt *et al*., 1988). Clark *et al*. (2011) investigated the effect of physiological stressors (PhS) and psychological stressors (PsS) on pain responses due to C&TD. They used bacterial lipopolysaccharide, shown to elicit hyperalgesia (Üçeylor *et al*., 2009), as PhS, while visual isolation and acoustic isolation of lambs from their dams represented PsS. The sensitivity of lambs (n=50) to stimuli with and without exposure to stressors, and with and without C&TD was assessed by measuring mechanical nociceptive thresholds (MNT), and recording responses to Semmes Weinstein Filaments (SWF); PCCs were also measured. The results showed that sensitivity to both stimuli was reduced after C&TD in all groups compared with the controls. While stress appeared to have no significant effect on SWF-sensitivity, stressed groups had significantly lower MNTs than unstressed and control groups (Clark *et al*., 2011). Interestingly, peak PCCs did not significantly differ among any of the treatment groups and returned to the low pre-treatment concentration in all groups within 3 hours. These results indicate that sensitivity to noxious stimuli is heightened in sheep exposed to stressful environments, while the nature of the stressor had no significant effect on sensitivity. PCCs indicate that the lambs had a physiological reaction to the procedures, irrespective of nature or presence of stressors.

Guesgen *et al*. (2011) investigated the effects of age and sex on pain-sensitivity in young male and female lambs (n=75) by exposing a shaved area on one leg to a laser beam on one day at three 15-minutes intervals between 1 and 12 days after birth. A timer measured the duration of exposure to the heat-source before the lamb responded by pulling the leg away from the thermal stimulus. Neither age nor sex alone had a significant effect on the medial latency to respond. However, age x sex interaction yielded significant differences. At the time of birth, both males and females responded very similarly to the stimulus. While latency to respond increased significantly with age in males, there was no significant difference with age in females. Unfortunately, the sample sizes for each group and sex were low (average n=6.25), thus differences among individuals in thermal tolerance or heat conduction through skin may be overrepresented in this study.

Edwards *et al*. (2011) utilised low-light film footage and PCC measurements collected during a study carried out by Hemsworth *et al*. (2009) on lambs 10-12 weeks of age, which investigated responses to surgical mulesing (n=11) and two alternative methods, intradermal sodium-lauryl-sulphate injection (n=11) and rigid plastic clips (n=11). Edwards *et al*. (2011) observed the latency and amount of time lambs spent drinking, feeding, lying, walking, running, kneeling, and standing in a normal position (maintenance behaviour) or standing with heads down. They found that mulesed individuals spent less time in maintenance behaviours than animals in alternative and control groups, but spent most of their time with lowered heads. Lambs treated with alternatives to mulesing and the control group exhibited similar behaviour patterns, but the control group spent less time standing with lowered heads than any other group. The latency to feed was tripled in the mulesed group compared with all other treatments and while there was no difference in the latency to lie, the first lying bout was much shorter in these lambs. These observations followed the PCC trends. Edwards *et al*. (2011) thus demonstrated that mulesing has a significantly more negative effect on welfare of lambs than the alternatives investigated in this study. Interestingly, there was no significant difference in the frequency of behaviours generally attributed to pain, such as tail-wagging, kicking, pawing and wound-licking.

While the long-term efficacy of alternative mulesing methods has not yet been investigated, Evans *et al*. (2011) found that clips are effective in increasing the bare-breech area. In contrast, Lepherd *et al*. (2011b) observed that intradermal injection may result in uneven penetration of tissues and dag formation.

Conclusions

The welfare-compromising effect of husbandry procedures in sheep can be reduced by delaying them until two weeks after birth (Guesgen *et al*., 2011). Performing the procedures in a clean environment within sight and hearing of the dams would minimise PsS and exposure to infectious agents, which have been shown to increase sensitivity to noxious stimuli. Additionally, increasing the bare-breech area with plastic clips was shown to be a less welfare-compromising than surgical mulesing (Edwards *et al*., 2011). In the longer term, efforts should be focussed on breeding bare-breech sheep to eliminate the need for wrinkle-reduction in Merino sheep in Australia.

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