

Refining Pain Relief during Lamb Castration and Tail-docking

Explores increasing welfare concerns about less-than-ideal pain relief being given to young lambs (Ovis aries) during basic husbandry procedures.

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Introduction

A number of painful procedures are generally performed on lambs without pain relief, including mulesing, tail-docking, castration, ear-marking and ear-tagging (EFSA, 2014; Melches *et al.*, 2007; Molony *et al.*, 2011; Rutherford, 2002). Techniques involved and use of analgesics are considerably affected by labour and economic constraints (Stewart *et al.*, 2014), which have significant impacts on the welfare of the animals involved (Molony *et al.*, 2002). Of particular concern are young animals (Guesgen, 2011; Bateson, 1991). Behaviour assessment and cortisol levels of lambs, kids and calves suggest that castration stress is greatest in lambs (Mellor, 1991). "Stress" results when an individual experiences acute, chronic or long-term disruption in homeostasis (Edwards *et al.*, 2011), but historically the idea of animals feeling pain was grossly underestimated or dismissed (Anand & Craig, 1996). Change in this aspect of animal welfare requires scientific innovation, a change in cultural values and a willingness to address economical, technological and regulatory constraints (Weary *et al.*, 2006).

Discussion

A number of studies have researched the effects of different drug types and modes of administration to relieve pain in lambs (Mellor *et al.*, 2008; Paull *et al.*, 2009) during such husbandry procedures as tail docking and castration. Although studies have shown the benefits of using local analgesics (Mellor & Stafford, 2000; Lomax *et al.*, 2010), it is still common practice to perform husbandry procedures without them (Stewart *et al.*, 2014).

Stewart *et al.* (2014) have investigated some "farmer friendly" forms of pain relief. The study investigated the effectiveness of pain relief for 4-week-old lambs with lignocaine-coated rubber rings (RR) for castration. Effectiveness was measured by both behavioural and physiological responses to the different treatments (Stewart *et al.*, 2014). Lambs (n=60) were randomly assigned to one of six treatments: handling exposure but without castration (C); castration with a standard RR (R); castration with a Lignocaine-coated ring (RLA); local anesthetic (LA-lignocaine) injected into testes and scrotal neck 4 minutes before the normal RR application (LADR); local anesthetic injected directly before normal RR application (LAIR); and injection of LA, no castration (LA). These techniques were somewhat similar to those performed by Mellor & Murray (1989) and Paull *et al.* (2009). Behavioural changes such as abnormal lying (e.g., lying with legs extended), abnormal activity (e.g., kick(s), backward walking or stomping) or postural changes (standing/lying) were one measure of response (Stewart *et al.*, 2014; Molony *et al.*, 2002). The other measure was physiological response, measured by plasma cortisol concentrations as described by Fisher *et al.* (2002) and Moloney *et al.* (2002).

Overall, the study found that lignocaine-coated elastrator rings offer practical pain relief for castration in lambs (Stewart *et al.*, 2014). The LA and RR reduced pain-associated behaviours and circulating cortisol concentrations to a significant degree compared to normal RR and is practical, time-efficient and cost-effective. However, at this stage it is not effective enough to meet optimal pain-relief standards (LADR) because diffusion through the skin from the rings was not rapid enough and further research is needed (Stewart *et al.*, 2014).

A recent study by Small *et al.* (2014) offered another alternative mode of pain relief for lambs at marking, via oral Meloxicam. Compared to the study by Stewart *et al.* (2014), husbandry techniques differed – knife castration and hot-iron tail-docking were tested rather than RR castration. Immediately before the procedure, pain relief was administered orally. Responses to the procedure improved with the pain relief administered. As in Stewart *et al.*'s (2014) study, this was measured by time taken to mother up afterwards and observed behavioural responses to the different treatments. In addition, measurements of weight change and wound scores were also taken 4-7 days post marking. The results were striking: Meloxicam-treated lambs showed no effect on mothering up and had a 7-fold reduction ($p < 0.001$) (Small *et al.*, 2014) in abnormal behaviours (the same behaviours as measured by Stewart *et al.* (2014)). Meloxicam-treated lambs spent more time displaying normal behaviours on the day of

marking, and slight benefits were also visible 24 hours after administration. Overall, this mode of pain relief appears to have provided better analgesia to lambs on the day of marking compared to Stewart *et al.*'s (2014) LA RR. However, in comparison, it does require additional handling and cost. Further research into these methods would be of great benefit.

While pain relief via analgesics is gold standard, there are also management strategies that may minimise pain responses in lambs during husbandry procedures (Guesgen, 2011). Sheep are herd animals and social context can modify behaviours and affect behavioural and physiological responses to stress. Presence of conspecifics and their physiological state can rapidly affect an individual's response to stimuli (in a positive or negative way) (Colditz *et al.*, 2012). Furthermore, social buffering is also a result of the relationships among the individuals involved and previous experience in the current environment (Guesgen *et al.*, 2014). Social buffering, such as among siblings, can result in opioid release and hence has an analgesic effect (Kikusui *et al.*, 2006; Ligout & Porter, 2004; Porter *et al.*, 1995) in stressful situations. Information such as this also suggests that welfare can be enhanced via management.

Suffering is in no way acceptable for any species. Findings by Clark *et al.* (2014) suggest that long-term effects may be seen in animals that had pain inflicted as neonates. As such, variations in management of lambs in early life may result in some long-term and even trans-generational effects on individuals. Clark *et al.* (2014) found that individuals (n=7) exposed to tail-docking without pain relief or suffering mild infection as neonates (the result of husbandry procedures), displayed higher levels of pain during labour. Furthermore, those individuals with lowered pain thresholds were found to give birth to lambs with lower pain thresholds (Clark *et al.*, 2014).

Conclusion

In conclusion, long-term effects of husbandry procedures, such as tail-docking and castration, can have long-term adverse effects on commercially important species. As such, variation in herd health and pain management has particularly important implications for animal health and welfare (Clark *et al.*, 2014).

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