

Practical alternatives for managing castration pain in piglets

J.A. Brown^{1,2}
Y.M. Seddon^{1,3}
J. Stookey³
Terry O'Sullivan⁴ and E.L. Davis^{1,3}

1 Prairie Swine Centre,
2 Department of Animal and Poultry Science, University of Saskatchewan,
3 Western College of Veterinary Medicine, University of Saskatchewan,
4 Ontario Veterinary College

Castration is a common procedure performed at an early age to prevent the development of boar taint, an unpleasant smell and odor in pork from intact males. Additional reasons for castration include reduction of aggression and mounting behaviour and improved animal handling. Research has determined that piglets experience significant pain and stress during the procedure, and that pain may last for up to five days

thereafter (Taylor and Weary, 2000, Marchant-Forde et al., 2014). To address this problem, the Canadian Code of Practice for the Care and Handling of Pigs requires that castration be done with analgesics to help control post-procedural pain (NFACC 2014). Furthermore, if piglets are castrated over 10 days of age, the Code requires that both an analgesic (to control pain following castration, eg meloxicam) and an anesthetic (to reduce local sensation during the procedure, eg lidocaine) must be provided. While considerable research has been done on management of pain in pigs following castration (Hay et al., 2003; Sutherland et al., 2012; O'Connell et al., 2014), few clear recommendations are available.

The Canadian Code of Practice for the Care and Handling of Pigs (NFACC 2014) has requirements for pain control at castration, but does not provide specifics regarding the appropriate analgesics or protocols for their administration. The Canadian Veterinary Medical Association (CVMA) and Canadian Pork Council (CPC) have provided some guidance on appropriate drugs and dosage, however, several questions remain. The NSAID drug Metacam has received regulatory approval for treating pain at castration, but other options such as ketoprofen and acetaminophen may also be effective. Castration is normally performed in piglets at 3 to 5 days of age. Some studies have suggested that castration may be less stressful in older pigs, but clear evidence is lacking. Also, the timing of drug administration has been questioned: providing pain control 30 min prior to castration may be more effective. However, producers would then need to handle pigs twice and coordinate injection and castration times at processing, and so producers would prefer to provide analgesia at the time of castration. The overall objective of this project was to determine optimal procedures for controlling post-procedural pain in piglets at

castration. Three specific objectives were: 1. to compare the effectiveness of different analgesics; 2. to study the effect of piglet age at castration on pain responses, and; 3. to study the timing of drug administration.

What did we do?

Castration of male piglets is known to cause pain during the procedure and for hours or days during recovery. As of July 1, 2016, the Canadian Code of Practice has required that swine producers provide analgesics to piglets at castration to alleviate post-procedural pain. However, complete information on the analgesic drugs available, their effectiveness and appropriate methods of delivery is not available. The objective of this research was to evaluate drugs and administration procedures

“The overall objective of this project was to determine optimal procedures for controlling post-procedural pain in piglets at castration. ”

to help identify effective and practical pain control strategies for piglets at castration. Three studies were performed: the first study compared the effectiveness of three non-steroidal anti-inflammatory drugs (NSAIDs) on treatment of post-castration pain. The second study examined the effect of age at castration (3 vs 10 days) on piglet's responses to castration when provided pain control or not. Study 3 compared the effectiveness of providing pain control 1 hour before the procedure to providing pain control immediately before castration, which would facilitate implementation of the procedure on-farm.

Behavioural and physiological responses were measured in each study. Of the behaviour measures studied, only tail wagging behaviour in Study 3 showed a tendency for interaction between treatment and time point. At 20 min after castration, piglets that were castrated did more tail wagging than those that were sham handled only. Behaviour measures using a specially designed-handling chute were not reliable. Cortisol results in blood were more informative. Study 1 showed higher cortisol concentrations at 45 minutes after treatment in castrated piglets compared with

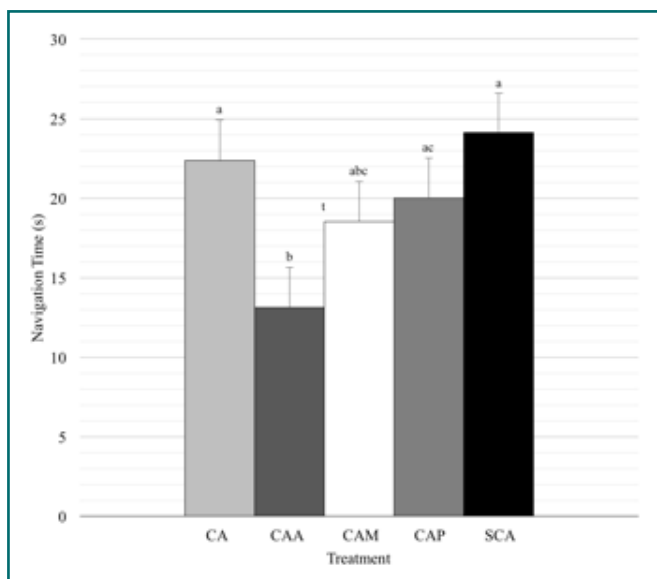


Figure 1: Study 1. Overall navigation time after treatment. Average of chute runs at 15, 40, 60 and 120 minutes post-treatment (LS means ± SEM in sec) for pigs given one of five treatments. Treatments: CA: castration control; CAA: castration with ketoprofen; CAM: castration with meloxicam; CAP: castration with paracetamol; and SCA: and sham castration. Bars with different superscripts are significantly different, $P \leq 0.05$.

those that were sham castrated, with piglets given pain control being intermediate. Studies 2 and 3 also showed an increase in cortisol concentrations following castration with higher levels in castrates compared to sham castrates. Comparing cortisol responses in pigs castrated at 3 and 10 days of age, older piglets showed lower cortisol levels overall and a greater effect of analgesia on reducing cortisol levels. In Study 3, providing

analgesia 1 h before castration resulted in significantly lower cortisol levels compared to pigs that did not receive analgesia. Providing analgesia immediately before castration was also significantly better than providing no analgesia, but was not as effective as provision at 1 hour prior. We conclude that the analgesic, ketoprofen, has a positive effect on reducing pain following castration when given 30 minutes to 1 hour before castration. Drug provision immediately before castration appears to be better than providing no pain control. Older piglets showed a clearer response when given pain control than young piglets, and could be used as a model for evaluating pain control options.

Conclusions

A number of conclusions and recommendations can be drawn from this project. First of all, we can conclude that, based on this work and previous studies, both meloxicam and ketoprofen can reduce cortisol levels following castration. In addition:

1. Providing ketoprofen 1 h before castration is more effective than administering the drug immediately before castration.
2. Pigs castrated at 10 days of age show lower cortisol levels in response to castration than pigs castrated at 3 days.
3. Providing ketoprofen to pigs castrated at 10 days of age had a greater effect on reducing pain than providing ketoprofen to pigs castrated at 3 days of age.
4. The handling chute used as a behavioural measure in these studies is of limited value.

Acknowledgements

We would like to acknowledge the financial support for this project from the Saskatchewan Agriculture Development Fund and Sask Pork. The authors would also like to acknowledge the strategic program funding provided by Sask Pork, Alberta Pork, Ontario Pork, the Manitoba Pork Council and the Saskatchewan Agriculture Development Fund.



(Practical Environmental... continued from pg.8)

Additionally, pigs with enrichment spent more time exploring their pens at three weeks post-weaning, indicating that they were more engaged with their surroundings. Pigs enriched post-weaning also showed reduced fear of humans, which has implications for both welfare and ease of handling. No difference in growth between the groups was found, however previous research indicates that the effects of early enrichment on growth are greater later in the pigs' lives. Pigs in this trial were not followed after 8 weeks of age. Therefore, more research should be carried out regarding the long-term growth and welfare effects of enrichment.

Of the objects used, the hanging knotted cotton rope was the most popular. Pigs are known to prefer malleable objects that they can chew and destroy because these qualities allow them to express their instinctive rooting and foraging behaviours. The attractiveness of the rope and its low cost make it a viable alternative to substrates such as straw. However, the drawback of destructible enrichments such as rope is the fact that they need

to be replaced regularly, which may make them more labour intensive than something that can be used for a longer period of time. If a more durable option is desired, commercial pig toys hanging from chains were also attractive to the piglets and required significantly less labour, however they involve a higher initial cost. Both the rope and the pig toys had the advantage of being suspended off the ground and were not soiled by feces, unlike the rubber mat and PVC pipe which were placed on the floor of the pen.

This study indicated that for producers looking to implement physical enrichment in their barns, a rotation of several inexpensive objects can be effective to increase exploration and reduce manipulation of pen-mates among piglets. Environmental enrichment for piglets is an exciting area of research because it also has potential to improve pig health, productivity, and public perception of the swine industry as a whole.

This research project was funded by an NSERC Undergraduate Student Research Award and by Prairie Swine Centre.

