Practical Alternatives for Managing Castration Pain in Piglets

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SUMMARY

The objective of this project was to identify which analgesics will provide optimal pain relief to piglets; at what age castration should be performed to minimize stress and production losses in piglets; determine if the timing of drug administration affects piglets' pain responses following castration and whether provision of oral sucrose prior to an analgesic can provide measureable benefits to pigs during the initial pain of castration. The first study evaluated the effectiveness of three non-steroidal anti-inflammatory drugs (NSAIDS) on post-castration pain. The second compared the influence of age at castration (3 days vs 10 days) on piglet welfare. Initial behavioural results from these two experiments found no significant differences in chute navigation times among the treatments studied. In study 2, the expected differences between sham handled and castrated piglets were not found, and no benefits of drug treatment were observed even though drugs were administered 15 minutes prior to testing.

INTRODUCTION

Castration is a common procedure performed on male piglets at an early age to prevent the development of boar taint, an unpleasant smell and odour in pork from entire males. Previous research has determined that piglets experience significant pain and stress from the procedure, and the pain may last for up to five days thereafter (Marchant-Forde et al. 2014). Subsequently, the Canadian Code of Practice for the Care and Handling of Pigs requires that as of July 1, 2016, castration performed at any age must be done with analgesics to help control post-procedure pain (National Farm Animal Care Council 2014). However, the Code does not provide specifics regarding the appropriate analgesics, or protocols for their administration.

MATERIALS AND METHODS

Study 1: *Comparing the effectiveness of three NSAIDs.*

Three approved analgesics were compared: meloxicam, ketoprofen, and paracetamol. Male piglets (n = 167) were randomly assigned to one of five treatments: 1) Castration with meloxicam (Metacam ® 0.4 mg/kg [0.3 ml/kg]) (CAM), 2) Castration with ketoprofen (Anafen ® 3 mg/kg [0.3 ml/kg]) (CAA), 3) Castration with acetaminophen (Pracetam ® 60 mg/kg [1.0 ml/kg]) (CAP), 4) Castration control (CA), and 5) Sham castration (SCA), with around 33 piglets per treatment. Immediately prior to castration, meloxicam and ketoprofen were given intramuscularly, while paracetamol was administered orally using a plastic transfer pipette.

Behavioural observations and physiological measures (involving blood collection) of stress were performed on separate litters of piglets to avoid the stress of blood collection influencing piglet behaviour. In total, one-hundred-six male piglets were studied for behaviour post castration, and blood samples were taken from 61 piglets. . In total eight piglets were removed from the study due to death or lameness. All piglets were weighed and individually marked at 2-3 days of age.

Study 2: *The effect of piglet age at castration on pain response and weight gain following castration.*

Male piglets (n= 117) were randomly assigned to six treatments: 1) Castration at 3 days of age with ketoprofen (YA), 2) Castration at 3 days of age (YC), 3) Sham castration at 3 days of age (YS), 4) Castration at 10 days of age with ketoprofen (OA), 5) Castration at 10 days of age (OC), and 6) Sham castration at 10 days of age (OS). For piglets that received ketoprofen (Anafen ® 3 mg/kg [0.3 ml/kg]), the drug was provided intramuscularly 30 min prior to castration.

Behaviour observations:

In both studies, behaviour observations were taken on piglets using a specially designed handling chute developed and validated as an objective behavioural measure of pain in castrated piglets. The duration of time piglets take to navigate the chute has been shown to take significantly longer in piglets castrated without pain control, compared to those handled but not castrated (Bilsborrow et al. 2016). The chute fit in place of the back gate of the farrowing pen and contained two hurdles, each 10cm in height. One day prior to treatment application, piglets were trained to navigate the chute.

On the day of treatment application, all piglets were first given a pre-treatment run at 30 min prior to the administration of treatment. Following treatment piglets were required to navigate the chute at 15, 30 45 and 120 minutes post-treatment. Piglets were given a total of two minutes to navigate the chute unaided. If a piglet laid down in the chute it was assigned a navigation time of two minutes and then gently pushed through the chute towards the farrowing pen.

Blood collection:

Study 1: Blood was collected from a total of 61 piglets at three time points. The first blood collection was taken at two days of age, to establish baseline cortisol levels. The second blood collection was taken at 45 minutes post treatment. A third blood collection was taken from 50% of piglets only, at one day post treatment.

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RESULTS AND DISCUSSION

The results of Study 1 suggest that there was a positive effect of the analgesic Ketoprofen as determined by the quicker navigation times of piglets in the CAA treatment, compared to the CA piglets. However, piglets in the CAM and CAP treatments were no different in navigation time as compared to CA and SCA piglets. The control group having a longer navigation time than other treatments suggests that results of this trial should be interpreted with caution, because the piglets may have experienced handling stress which influenced their navigation times.

The results of Study 2 showed no significant differences between treatments, even within piglet age group. Because castrated piglets showed similar navigation times to sham castrated piglets, it again suggests that there was an additional stressor affecting the navigation time of the piglets. This may be a result of handling stress, or an additional environmental stressor, which played a larger role than expected.

CONCLUSIONS

The behaviour results collected from studies 1 and 2 have not as yet revealed any clear differences among the treatments, particularly as the sham groups had navigation times that were no different from castrated groups. It is believed there must have been a confounding environmental influence affecting the piglets.

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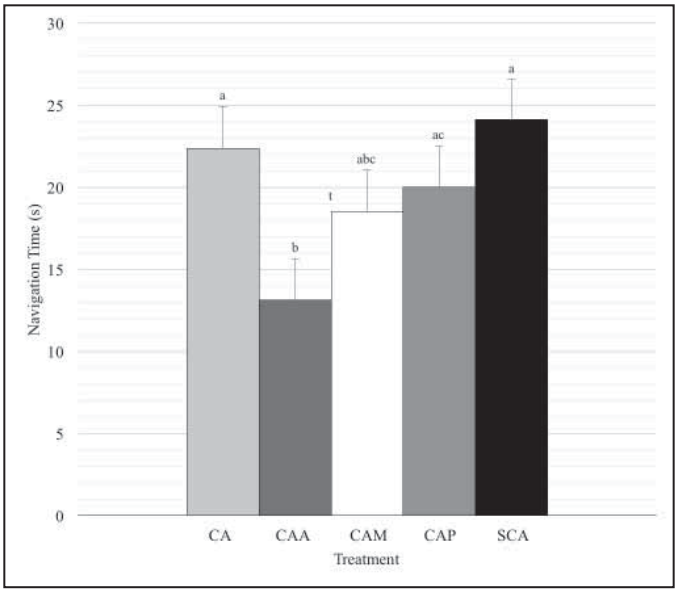

Figure 1. Overall navigation time (seconds, mean and SEM of navigation times recorded at 4 time points) between treatment groups post-treatment. Five treatments: castration control (CA), castration with ketoprofen (CAA), castration with meloxicam (CAM), castration with paracetamol (CAP), and sham castration (SCA). Significance shown at P > 0.05. Where superscripts differ, P<0.05. Trend = t.

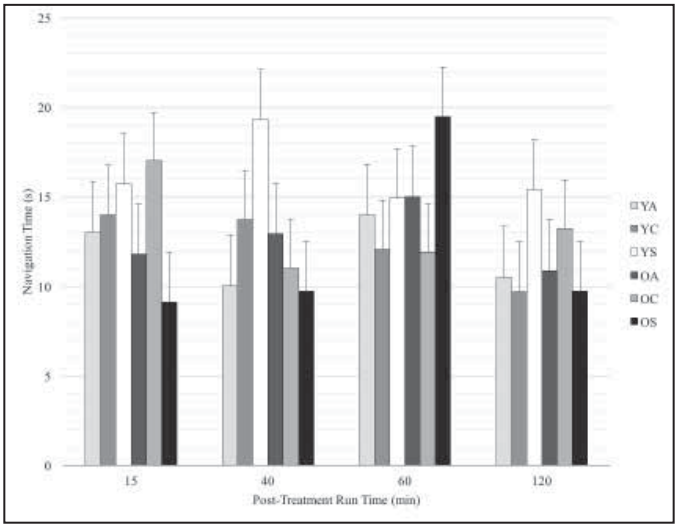

Figure 2. Mean chute navigation time (s, ±SEM) at four time points post-treatment. Six treatments: castration at 3 days of age with ketoprofen (YA), castration at 3 days of age (YC), sham castration at 3 days of age (YS), castration at 10 days of age with ketoprofen (OA), castration at 10 days of age (OC), and sham castration at 10 days of age (OS).