

The effects of mitigating the pain piglets experience during and after castration

Michelle Lam¹, Derek Haley², Tina Widowski¹, Robert Friendship²

¹Department of Animal and Poultry Science, Ontario Agricultural College, University of Guelph, Guelph, Ontario

²Department of Population Medicine, Ontario Veterinary College, University of Guelph, Guelph, Ontario



Introduction

Controlling the pain associated with routine piglet processing procedures (e.g. castration), is receiving increasing attention. Implementing pain control faces certain logistical challenges because it needs to be practical under farm conditions, and it must take into consideration issues of food safety. The aim of this study is to establish, using a variety of behavior measures, whether providing piglets with a local anaesthetic (lidocaine) and analgesic (meloxicam) are effective in mitigating pain during and following castration.

Materials & Methods

A total of 396 male piglets were used. Four piglets (4- to 8-days-old) from the same litter were chosen and randomly assigned to one of four castration treatments (see Table 1). The treatments were balanced by piglet weight. The observer evaluating piglet responses was blinded to the treatment they received.

Table 1. Four castration treatment groups.

| TREATMENT | INTRA-TESTICULAR INJECTION (0.5ml/testicle) | INTRA-MUSCULAR INJECTION (1mL/2.5 kg) |
|------------------------------------|--|--|
| 1. Negative control | Saline | Saline |
| 2. Local anaesthetic | Lidocaine | Saline |
| 3. Analgesic | Saline | Meloxicam |
| 4. Local anaesthetic and analgesic | Lidocaine | Meloxicam |



Figure 1. (A) Intra-testicular injection. (B) Intra-muscular injection.

Drugs used:

Local anaesthetic – Lidocaine, (Lidocaine hydrochloride 2%, without epinephrine, Alveda Pharma), 0.5 ml/testicle, 20mg/mL

Analgesic – Diluted meloxicam (Metacam®, Boehringer Ingelheim), 0.4 mg/kg of body weight

Castration occurred 3 to 6 min after the first injection of the lidocaine, because its concentration is highest in the spermatic cord after 3 min, with an approximate action time of 1 hr (Ranheim, et al., 2005).

To evaluate acute pain: A 3-point subjective scoring system (0, 1, 2; Table 2) was used to characterize the physical response of the piglets.

Table 2. Criteria for the subjective scoring of physical responses of piglets to being castrated.

| SUBJECTIVE SCORE | PHYSICAL RESPONSE |
|------------------|---|
| 0 | No physical movement |
| 1 | Slight movement with intermittent gaps of stillness |
| 2 | Sustained struggling (>3s) |

To evaluate post-surgical pain: Instantaneous scan sampling to record the behavior of a subset of the piglets from every treatment group, when returned to the sow post-castration was performed.

To evaluate growth rate: The piglets were weighed one or two days prior to castration and at weaning (21±4 d of age)

Results

Acute pain:

Piglets given lidocaine produced less physical response during the incision ($P<0.0001$) and pull phases of castration ($P<0.0001$) (Fig. 2). Reactions to injection were greater than to incision.

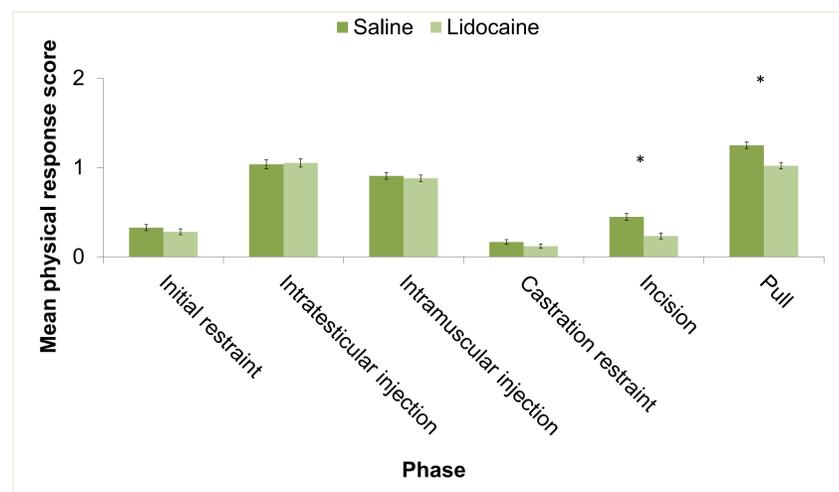


Figure 2. The mean physical response score (±SEM) for each phase of the castration study process for piglets that received saline and those that received lidocaine.

The overall physical response score, which included the response to the two injections, the incision, and the pull phase of castration, was lower for piglets that received lidocaine ($P=0.0042$), compared to those that received saline.

Behavioral observations:

At 0h, piglets that received both lidocaine and meloxicam were nursing significantly more than piglets in other treatment groups ($P<0.05$) and piglets that received lidocaine were at the udder significantly more than piglets that received saline ($P<0.05$).

At 24h, piglets that received both lidocaine and meloxicam were isolated significantly less compared to piglets in other treatment groups ($P<0.05$).

Also, 24 h after castration piglets that had received lidocaine huddled less than piglets that had received saline ($P=0.05$). There was no difference between treatment groups for growth rate.

Summary

Injecting lidocaine into the testicles 3 min prior to castration reduced the acute pain associated with severing the spermatic cord. The provision of both lidocaine and meloxicam reduced some post-castration behaviors such as isolation which may indicate post-operative pain. The method used in this study required double handling, which would increase labour requirements. However, in the future, the control of pain associated with piglet processing may become a requirement in order to access certain markets and veterinarians are likely to be called upon to provide advice about these procedures. This study provides evidence that local anesthetic and an analgesic in combination is beneficial to improving piglet welfare.

References

Ranheim, B., Haga, H. A., & Ingebrigtsen, K. (2005). Distribution of radioactive lidocaine injected into the testes in piglets. *Journal of Veterinary Pharmacology and Therapeutics*, 28(5), 481-483.

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