Canadian Association of Swine Veterinarians

Association Canadienne des Vétérinaires Porcins

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CASV-ACVP Summary on Analgesic and Anesthetic Options for Use in Swine for pain mitigation during castration/tail docking

Definitions:

Analgesic: An agent that alleviates pain without loss of consciousness. Examples include NSAIDS like ketoprofen, meloxicam and flunixin meglumine.

Anesthetic: An agent that induces loss of feeling or sensation, especially the loss of pain sensation. Used during surgery or a painful procedure (e.g. castration). Anesthetic can be general (the animal is unconscious) or local (only a certain area is render insensitive). Examples include lidocaine (local anesthetic), isoflurane (general anesthetic).

Non-Steroidal Anti-Inflammatory Drug (NSAID): Group of pharmaceutical products that have analgesic, anti-pyretic and anti-inflammatory properties.. Different NSAID have different mode of actions against pain, certain being more effective than other in certain circumstances.

Anti-Inflammatory Steroid (AIS): Group of pharmaceutical products that do not have analgesic properties. They help reduce inflammation and by doing so, they can help alleviate pain due to the inflammation process.

IM injection: Intramuscular

SQ injection: Subcutaneous

Oral: Administer through the mouth

Transdermal: apply on the surface of the skin to deliver medication through the skin and into the bloodstream.

Veterinarian/Client/Patient Relationship (VCPR): According to CVMA (1), a VCPR exists when all of the following conditions have been met:

- The veterinarian has assumed the responsibility for making clinical judgments regarding the health of the animal(s) and the need for medical treatment, and the client has agreed to follow the veterinarian's instructions.

- The veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s) or by medically appropriate and timely visits to the premises

where the animal(s) are kept.

- The veterinarian is readily available for follow-up evaluation, or has arranged for emergency coverage, in the event of adverse reactions or failure of the treatment regimen.

Background:

With the adoption of the Code of Practice for the care and handling of swine 2014 all piglets castrated now require the administration of an analgesic to help control post-procedure pain (Figure 1). They also require the administration of an anesthetic if castration is performed after 10 days of age.

Likewise, since July 1, 2016, tail docking piglets of any age require administration of an analgesic to help control post-procedure pain (Figure 2).

Analgesics and Anesthetics:

Currently, there is one licensed analgesic with a claim about reducing pain post-castration in swine in Canada; Metacam® for Swine. There are also other analgesic options that can be used with an **extra-label drug use recommendation by a licensed veterinarian holding a valid VCPR.** The CASV-ACVP encourages pharmaceutical companies and the CPC to continue striving for approved analgesics and anaesthetic drugs for use in swine for pain control in Canada.

Generally speaking, the group of drugs called NSAIDs are licensed for use in swine in Canada, mainly for the reduction of fever and inflammation. As a group of pharmaceutical products, NSAIDs do have analgesic properties. When administering NSAIDS at the time of the painful event, only post surgical pain is being addressed. These medications, in general, are formulated to treat older animals, and not neonatal pigs; except for Metacam® for Swine. As a result, the concentration of the medication will require very precise and small dosage administration. These dosage options will need to be discussed with your veterinarian. Some products are to be administered by intra-muscular injection and some are to be given orally. Current transdermal analgesic (ex: Banamine® transdermal) licensed for use in cattle in Canada is not considered effective for analgesia in swine. The effectiveness of this mode of administration in cattle does not make it necessarily effective when used in pigs and mode of action and absorption rate differ by species (2). A list of NSAID products with a DIN (Drug Identification Number) approved for use in swine or in food animals in Canada is listed below (Tables 1 & 2). Anti-inflammatory steroids (like Isoflupredone acetate, trade name Predef®2x or Dexamethasone) are not analgesics and the CASV-ACVP welfare committee does not recommend their use for relief of post-procedural pain. Pain is one of the outcomes of the inflammatory process. Pain, however, is not always caused by inflammation. When an animal is going through an inflammatory process there may be some pain. Treatment with an anti-inflammatory product may significantly reduce the pain associated with inflammation and the product label may indicate that this is so. Some anti-inflammatory products are more effective than others in reducing pain. The CASV-ACVP welfare committee was unable to obtain information from a pharmacologist that would help to clarify the level of pain relief provided by isoflupredone. The CASV-ACVP welfare committee was unable to find any research focused on evaluating the level of pain relief provided by isoflupredone and most specifically with respect to post procedural pain control (e.g. castration, tail docking). On the opposite, the CASV-ACVP welfare committee was able to find research that quantified the level of pain control provided by NSAID. Subsequently, the CASV-ACVP welfare committee does not recommend the use of

isoflupredone, or other anti-inflammatory steroids, for relief of post-procedural pain, but does acknowledge that isoflupredone can be used to control inflammation and consequently the pain that is associated with the inflammatory process.

There are a variety of approved anesthetic pharmaceutical products licensed for use in swine or in food animal in Canada. Each anesthetic will have advantages and disadvantages, listed in Table 3. Some anesthetic products will also have analgesic properties. Anesthetic products must be administered 2-5 minutes prior to the painful procedure to provide proper anesthesia. Anesthetic agent can be administered for general anesthesia (ex: isoflurane) or local anesthesia (ex: lidocaine). At his time, topical anesthetic is not considered effective to reduce pain during castration in swine. Although topical anesthetic does provide some analgesia of the skin, it does not provide enough analgesia of the spermatic cord to be considered as an anesthetic alternative for castration. **Specific protocols should be discussed with the herd veterinarian.**

There is currently one option for analgesia that is licensed for use in swine in Canada, and label to reduce pain post-castration; **Metacam® for Swine**. However, if a different option of analgesia is selected, or if compounding is performed (ex: analgesic mixed with iron), it is the responsibility of the prescribing veterinarian to ensure the chosen treatment is effective, provide adequate analgesia, is justified and follow regulations and industry standards like CQA®.

Moreover, only licensed analgesic and anesthetic products are listed in these tables and API (active pharmaceutical products) have not been considered and are beyond the scope of this paper.

Table 1: NSAID analgesic options with Swine Claim for post-operative pain

Active Ingredient	Example of Trade Name	Concentration	Route	Slaughter withdrawal	Dosage mg/kg	Dosage per treatment	Dosage per piglet (2kg)
Meloxicam	Metacam® for Swine	5 mg	IM	5 days	0.4 mg/kg	1ml/12.5kg	0.16ml

Table 2: NSAID analgesic options (ELDU)

Active Ingredient	Example of Trade Name	Concentration	Route	Slaughter withdrawal	Dosage mg/kg	Dosage per treatment	Dosage per piglet (2kg)
Ketoprofen	Anafen® Ketoprofen V	100 mg	IM	7 days	3 mg/kg	1 ml/33 kg	0.06 ml
Flunixine meglumine	Banamine® Flunazine® Cronyxin® Injection Flunixin Injection	50 mg flunixine (83 mg meglumine)	IM	13 days	2.2 mg/kg	1 ml/22.5 kg	0.09 ml
Meloxicam	Metacam 20® Rheumocam® Injection Meloxidyl®	20 mg	IM	5 days	0.4 mg/kg	1 ml/50 kg	0.04 ml
Meloxicam	Rheumocam Injection	5 mg	IM	5 days	0.4 mg/kg	1ml/12.5kg	0.16ml
Meloxicam	Meloxicam Oral Suspension	15 mg	Oral	Must request cGFARAD withrawal	0.4 mg/kg	1 ml/37.5 kg	0.05 ml
Acetaminophen	Pracetam 20% O.S.	200 mg	Oral	3 days	30 mg/kg	1ml/6.7kg	0.3 ml

Table 3: Anesthetic options for swine

Ingredient	Example of Trade Name	Concentration	Route	Dosage mg/kg	Dosage per treatment
Lidocaine HCL & Epinephrine	Lidocaine®	20mg/ml	SQ/intra-testicular	4-5 mg/kg * (total dosage per pig should not exceed that level)	Toxicity level 6-11 mg/kg *
Lidocaine HCL	Lurocaine	20mg/ml	SQ/intra-testicular	4-5 mg/kg * (total dosage per pig should not exceed that level)	Toxicity level 6-11 mg/kg *
Ketamine	Narketan, Ketalean®, Ketaset®	Veterinary use only, not approved for swine within CQA®			

- **<u>Reference (3) and (4)</u>**

Figure 1: Code of practice for the care and handling of swine-2014

4.5.1 Castration

Typically, piglets are castrated before weaning to control "boar taint", and to reduce aggression and handling challenges associated with intact males.

Castration of pigs is painful regardless of age. The administration of analgesics is beneficial in controlling post-procedure pain (2). The application of topical anesthetics is ineffective in relieving pain during castration (2).

Immunization against boar taint, also known as immuno-castration, is an effective alternative to surgical castration. Production of intact males at lighter weights reduces boar taint, but does not guarantee its absence (2). In addition, aggression inherent with raising intact males presents other welfare challenges (2).

REQUIREMENTS

Castration performed after 10 days of age must be done with anesthetic and analgesic to help control pain.

As of July 1, 2016, castration performed at any age must be done with analgesics to help control post-procedure pain.

Figure 2 Code of practice for the care and handling of swine-2014

4.5.3 Tail Docking and Tail-Biting

Tail-biting is both a welfare and economic problem that involves destructive chewing of pen-mates' tails. Tail-biting can result in serious wounds and bleeding, and more severe consequences such as infection, spinal abscess, paralysis, and in extreme cases, death (24).

Tail-biting can be triggered by a wide range or combination of factors including overstocking, feed deficiencies, incorrect temperature levels, inadequate ventilation, drafts, high levels of dust and noxious gases such as ammonia, and lack of enrichment.

Some studies suggest that environmental enrichment, especially the provision of straw, reduces the chance of tail-biting (25).

The practice of tail-docking has been adopted primarily to reduce the risk of tail-biting. Docking tails too short may lead to infections or prolapses. Docking tails too long is not effective. (24).

Tail docking is known to cause acute stress, as indicated by physiological and behavioural responses. Animals with docked tails may develop increased sensitivity and chronic pain (26).

REQUIREMENTS

Pigs must be routinely monitored for signs of tail-biting, and corrective action, as necessary, must be taken (e.g. assess possible contributing factors; remove tail-biter; add rooting and/ or physical enrichment).

Tail docking of pigs over 7 days of age must be done with pain control.

As of July 1, 2016, tail-docking performed at any age must be done with analgesics to help control post-procedure pain.

References :

(1) CVMA Antimicrobial Prudent Use Guidelines 2008 for Beef Cattle, Dairy Cattle, Poultry and Swine. http://canadianveterinarians.net/documents/cvma-antimicrobial-prudent-use-guidelines-2008-for-beef-dairy-poultry-swine

(2) Malavasi LM, Augustsson H, Jensen-Waern M, Nyman G. The effect of transdermal delivery of fentanyl on activity in growing pigs. Acta Vet Scand. 2005;46:149–157

(3) Prunier and coll. A review of the welfare consequences of surgical castration in piglets and the evaluation of non-surgical methods. Animal Welfare 2006, 15: 277-289.

(4) Haga and coll. Castration of piglets: the analgesic effects of intratesticular and intrafunicular lidocaine injection. Veterinary Anaesthesia and Analgesia, 2005, 32, 1–9