

AVA statement on castration of pigs under CO₂ anaesthesia

It is now well accepted that many common husbandry procedures in food animals, such as castration, dehorning and tail docking are acutely painful, even in very young animals. Thus, either medical (reduced morbidity and mortality), economical (optimised production) and ethical (adequate animal welfare) reasons dictate that measures are taken to prevent or alleviate pain and so render any procedure as “humane” as possible. To meet these expectations, different strategies have recently been suggested for castration of piglets throughout Europe. Among them, the use of carbon dioxide (CO₂), as an anaesthetic, has already been adopted in the Netherlands. CO₂ has been used to induce short term anaesthesia, mainly prior to slaughter, or euthanasia in both food and laboratory animals for more than 50 years but its use still raises questions with respect to animal welfare. Advantages of the method are that it is quick, safe for the operator, produces no gaseous waste and that the pigs are undoubtedly unconscious during the procedure. However, evidence from the literature obliges us to have reservations:

- Relevant data in human beings suggests that CO₂ administration is painful, especially to the nose (burning, tingling or prickling sensation has been reported, correlated with CO₂ concentration) and causes airway irritation, substernal pain, general discomfort and muscle tremors. It also causes a degree of stress due to severe acidosis and asphyxia.
- CO₂ in similar concentrations than those used to induce anaesthesia, has been used as a painful and stressful stimulus in experimental studies on animals.
- Stress due to asphyxia (gasping, laboured breathing), muscle tremors/shaking, excitation and avoidance behaviour (withdrawal reflex) has been observed in pigs given CO₂ before slaughter. Post-mortem lesions (pulmonary oedema, haemorrhage) have also been documented. These observations were not influenced by the method by which CO₂ was administered around the time of slaughter, for example with or without supplemental oxygen.
- Stress seems to be reduced by using higher concentrations of CO₂ because the time to unconsciousness is reduced. Therefore although using higher concentrations of CO₂ for euthanasia or anaesthesia prior to slaughter would appear to be preferable to the use of lower concentrations, in view of the human experience regarding noxiousness this is not an appropriate option for provision of surgical anaesthesia prior to castration.
- There is evidence that CO₂ increases pain threshold but no real evidence of the abolition of nociception and related consequences (cortisol release, sympathetic activation)
- Even if CO₂ could be considered to provide some analgesia concomitant to the loss of consciousness it induces, it certainly provides no mean of postoperative pain alleviation
- There is a narrow safety margin for the use of CO₂ for anaesthesia (in terms of CO₂ concentration and time of exposure)

Therefore, with respect to animal welfare and the aim of alleviating pain during and after castration of piglets, carbon dioxide anaesthesia would not seem to be an appropriate or advisable technique.

SELECTED REFERENCES

- 1) KOHLER ET AL. (1988) "INHALATION ANAESTHESIA FOR THE CASTRATION OF PIGLETS: CO₂ COMPARED TO HALOTHANE" ZENTRALBL VETERINARMED A.45(10):625-33
- 2) SVENDSEN (2006) "CASTRATION OF PIGLETS UNDER CARBON DIOXIDE (CO₂) ANAESTHESIA" JOURNAL OF VETERINARY PHARMACOLOGY & THERAPEUTICS, VOLUME 29, SUPPLEMENT 1, PP. 54-55
- 3) KLUIVERS-POODT ET AL (2007) ANIMAL SCIENCE GROUP REPORT 85 "CASTRATION UNDER ANAESTHESIA AND/OR ANALGESIA IN COMMERCIAL PIG PRODUCTION" (2007)
- 4) MÜHLBAUER ET AL (2009) INVESTIGATION ABOUT CO₂ GAS ANAESTHESIA AS A ALTERNATIVE OPTION FOR PIGLET CASTRATION WITHOUT ANAESTHESIA (IN GERMAN)
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