Are severely depressed suckling pigs resistant to gas euthanasia?

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Abstract

Severely depressed pigs exhibit differences in a number of important parameters that may affect gas euthanasia, including decreased respiration rate and tidal volume. Hence, the objectives of this study were to assess the efficacy and animal welfare implications of gas euthanasia of suckling pigs with varied disease severity (severely depressed [DP] vs other [OT]). A 2 × 2 factorial design was utilised with two gas types (carbon dioxide [CO2]; argon [Ar]) and two flow rates (G = gradual, 35% box volume exchange per min [BVE min⁻¹]; P = prefill + 20% BVE min⁻¹). Sixty-two pigs were enrolled and tested as DP/OT pairs in each gas treatment combination. Pigs identified for euthanasia were assigned a subjective depression score (0 = normal to 3 = severely depressed). Pigs scored 3 and ≤ 1 were categorised as DP and OT, respectively. Significantly lower respiration, rectal temperature, pulse and weight were observed for the DP pigs relative to OT. Pigs were assessed for behavioural indicators of efficacy and welfare. No differences were observed between DP and OT when using P-CO2 or G-CO2. However in P-Ar, DP had greater latency to loss of consciousness relative to OT (212 ± 22 vs 77 ± 22 s), decreased latency to last limb movement (511 ± 72 vs 816 ± 72 s), greater duration of open-mouth breathing (151 ± 21 vs 69 ± 21 s), decreased duration ataxia (101 ± 42 vs 188 ± 42 s) and decreased righting response (27 ± 11 vs 63 ± 11 s). The G-Ar treatment was removed due to ethical concerns associated with prolonged induction. In conclusion, depression score did not affect pig responses to euthanasia with CO2 gas, but did affect responses to Ar. Furthermore, Ar was associated with a prolonged euthanasia process, including frequencies and durations of distress behaviours.

Keywords: animal welfare, argon, carbon dioxide, euthanasia, moribund, swine

Introduction

Most swine producers and veterinarians agree that euthanasia is the best choice for low viability pigs, especially when there is suffering due to injury or illness. Low viability suckling pigs identified for euthanasia typically consist of two broad categories: unthrifty, ill and depressed pigs vs injured or small but alert pigs. Pigs with low birth weights (< 0.8 kg) are often considered underdeveloped and more than 60% do not survive (Straw et al 1999). Carbon dioxide has been identified as an acceptable inhalant method for euthanasia of pigs because it is a rapid depressant with established analgesic and anaesthetic properties (AVMA 2013). Carbon dioxide is commonly used for stunning market-weight pigs at slaughter, and remains the most commonly implemented gas for on-farm euthanasia of suckling and nursery age pigs in the USA (Daniels 2010). The American Veterinary Medical Association Panel on Euthanasia notes:

… parameters of the technique need to be optimized and published to ensure consistency and repeatability. In particular, the needs of piglets with low tidal volume must be explored (AVMA 2013; p 61).

Additionally, anecdotal reports from stockpeople suggest efficacy is decreased when euthanising the moribund (severely depressed) pig relative to a more robust and alert pig, and this may account for failed euthanasia attempts in which additional exposure to the gas or a secondary euthanasia method is required. Severely depressed pigs differ from robust pigs in several physiological parameters that may be important for gas euthanasia. Several causal factors could contribute to creating the depressed state, including disease, injury and...