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Hertfordshire AL4 8AN, UK
www.ufaw.org.uk

Animal Welfare 2017, 26: 111-120
ISSN 0962-7286
doi: 10.7120/09627286.26.1.111

Humane euthanasia of neonates I: validation of the effectiveness of the Zephyr EXL non-penetrating captive-bolt euthanasia system on neonate piglets up to 10.9 kg live-weight

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Abstract

*To determine if mechanical blunt force trauma using a non-penetrating captive bolt was a viable method of producing an immediate stun/kill in neonate piglets (*Sus scrofa domesticus*) as an alternative to manual blunt force trauma. Piglets (n = 60) were acquired from a local producer and allocated to one of five weight ranges: birth weight to 3 kg (n = 12); 3 to 5 kg (n = 11); 5 to 7 kg (n = 13); 7 to 9 kg (n = 13); and 9 to 11 kg (n = 11). These piglets with an average live-weight of 6.1 kg were anaesthetised and electroencephalogram (EEG) recording electrodes inserted sub-dermally over the right cranium to allow recording of Visual Evoked Potentials (VEPs). Following recording of baseline VEPs in the anaesthetised state, the piglet was shot once in the frontal-parietal position with a Bock Industries Zephyr EXL non-penetrating captive bolt powered by 120 psi air pressure. Movement scoring, behavioural indices of loss of brain function and VEPs were monitored throughout. VEPs were lost immediately in all piglets shot when the head was resting on a hard surface. This experiment demonstrates that mechanical blunt-force trauma, using a single-shot, non-penetrating captive bolt, such as the Zephyr EXL, provides for an immediate stun kill in neonate piglets up to 10.9 kg live-weight. This immediacy of action, combined with reproducible effects will improve the welfare of piglets to be subjected to on-farm euthanasia due to disease, ill-thrift or other commercial concerns.*

Keywords: *animal welfare, captive bolt, euthanasia, mechanical stunning, piglet, Visual Evoked Potentials*