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Assessment of stun quality after gunshot used on cattle: a pilot study on effects of diverse ammunition on physical signs displayed after the shot, brain tissue damage and brain haemorrhages

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Abstract

Moving the slaughter process from the abattoir to the animals' familiar environment has the potential to reduce pre-mortal stressors to a minimum and contribute considerably to improved animal welfare at slaughter. On-farm stunning and killing of free-range cattle via gunshot became legal in Germany in November 2011, including for commercial sale of the meat. As an effective stun is essential for maintaining animal welfare until the animal dies, the goal of this study was to assess the feasibility of delivering an instantaneous and deep stun by an accurate frontal gunshot at cattle. Thirty free-range cattle (Galloway, German Angus) were shot with five different combinations of rifles and bullets. A stun-quality protocol was developed to assess musculoskeletal, optical and respiratory signs displayed after the shot. Key signs, such as failure to collapse, corneal reflex, spontaneous blinking, eyeball rotation or eyeball movement, distinct vocalisation and rhythmic breathing were not evident in 29 of the 30 cattle. Dissections of the heads were used to detect penetration depth of the projectile as well as evaluate brain tissue damage and brain haemorrhage caused by the shot. Tissue damage was marginal and not related to the ascertained level of stun quality. Brain haemorrhages assumed to be sufficient for causing a deep stun were detected in 25 out of 30 cattle. Accurate shot placement turned out to be more important than the application of a certain calibre. However, it was considered crucial for safety reasons that the projectile should remain within the cranial cavity. As long as there are high levels of accuracy, gunshot was considered to be an effective stunning method with the potential of maintaining high standards of animal welfare until death occurs.

Keywords: *animal welfare, brain haemorrhage, cattle, gunshot, physical signs, stun quality*