Captive-bolt euthanasia of cattle: determination of optimal-shot placement and evaluation of the Cash Special Euthanizer Kit® for euthanasia of cattle

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Abstract

Humane euthanasia of cattle represents a challenge to the beef and dairy industries. Penetrating captive bolt, while traditionally considered to be only a stunning method, can be an effective single-step euthanasia method if both the cerebral cortex and brainstem are disrupted. This report describes a preliminary study investigating the likelihood of brainstem disruption for two captive-bolt shot locations. Heads were collected from 15 cattle that died or were euthanised for reason unrelated to the study and were then randomly assigned to one of two shot placement groups. Heads in the first group (n = 7) were shot at the intersection of two lines drawn from the medial canthus to the opposite horn or top of the opposite ear. Heads in the second group (n = 8) were shot at the intersection of two lines drawn for the lateral canthus to the opposite horn or top of the opposite ear. The guns were held perpendicular (as assessed visually) to the plane of the forehead. Shot placement was then assessed using computed tomography and disruption of the brainstem was determined. In the first group, the captive bolt failed to disrupt the brainstem in any of the heads. In the second group, the bolt disrupted the brainstem in 6 of 8 heads. The results suggest that selecting a higher shot location leads more readily to disruption of the brainstem which reduces the risk of regaining sensibility and should therefore improve animal welfare when cattle are euthanised with a penetrating captive bolt.

Keywords: animal welfare, captive bolt, cattle, computed tomography, euthanasia, shot placement

Introduction

Humane euthanasia of cattle presents special challenges to the beef and dairy industries. Euthanasia is necessary in cases of disease or injury that are impossible or impractical to treat, in cases of prolonged recumbency, when the condition of the animal is not suitable for human consumption and occasionally for diagnostic purposes. Additionally, euthanasia of large numbers of animals may be warranted in cases of an infectious disease outbreak. There are three practical options available to producers and/or veterinarians for euthanising cattle (AVMA 2007). These options include anaesthetic (barbiturate) overdose, captive-bolt shot, or gunshot. While each of these options is effective, each has its own pros and cons.

Expense, lack of access for producers, and the concern of environmental contamination from chemical residues in the carcass make barbiturate overdose impractical in most cases of on-farm euthanasia. Additionally, injectable euthanasia requires excellent animal restraint and close contact with the animal. All of these concerns make injectable euthanasia impractical in a mass depopulation situation.

Gunshot is effective when properly applied, does not require restraint or close contact with the animal, and could be effective for mass depopulation. However, obvious safety concerns exist for the operator, bystanders, and other animals. Additionally, appropriate use of gunshot requires a certain level of operator skill and legal issues concerning firearm use may arise in some areas.

Traditional captive-bolt guns are used routinely to stun animals in commercial slaughter facilities. When used properly, they may be effective tools for euthanising cattle of various ages (Gardner 1999; Shearer 2005). Concern as