Assessment of stun quality at commercial slaughter in cattle shot with captive bolt

S Atkinson*, A Velarde‡ and B Algers†

† Department of Animal Environment and Health, Faculty of Veterinary Medicine and Animal Science, Swedish University of Agricultural Sciences, Box 234, 532 23 Skara, Sweden
‡ Animal Welfare Subprogram, IRTA, Finca Camps i Armet, 17121 Monells (Girona), Spain
* Contact for correspondence and requests for reprints: Sophie.Atkinson@slu.se

Abstract

Cattle may suffer pain and distress if incorrectly stunned. Regular monitoring of stun quality in abattoirs is now required by EU law. This study aimed to assess stun quality in cattle slaughtered under commercial conditions. A stun protocol was developed to evaluate when inadequate stunning occurred. This included rating of identified symptoms into three levels from highest to lowest risk for inferior animal welfare. Stun to stick interval times, shot accuracy, repeat shots, and stun quality variations between different cattle classes and by different shooters was also investigated. A total of 585 bulls and 413 other cattle classes (306 cows, 58 steers and 49 calves) were studied. Inadequate stunning occurred in 12.5% (16.7% of bulls, compared with 6.5% other cattle). Bulls displayed symptoms rated the highest level for inferior stun quality three times more frequently than other cattle. Despite being shot accurately, 13.6% bulls were inadequately stunned compared with 3.8% other cattle. Twelve percent of cattle were re-shot, and 8% were inaccurately shot. Calves were shot inaccurately more frequently (14%) than other cattle. Percentage of cattle shot inaccurately ranged from 19% for the least experienced shooter to 5% for the most experienced. Stun to stick times averaged 105 (± 17) s posing questions for animal welfare, considering the number of cattle inadequately stunned. Stun quality could be improved by using more powerful stunners for shooting bulls, regular servicing of weapons, and use of neck restraints to improve shot accuracy. This study highlights the importance of external monitoring of stun quality at slaughter.

Keywords: animal welfare, audits, captive-bolt stunning, cattle welfare, commercial slaughter, stun quality assessment

Introduction

The protection of animals at the time of slaughter is a matter of public concern and regular monitoring of stun quality in abattoirs is now required by EU law (EC 2009). Animals are stunned prior to slaughter to ensure they are unconscious during the sticking and bleeding procedures until death occurs. Captive-bolt stunning causes an abrupt trauma to the skull, brain and associated blood vessels, and a subsequent array of physically displayed symptoms depending on where, how deep and at what velocity the bolt enters the forehead and brain. Death may result as a consequence of the physical damage to the brain but it is not a guaranteed outcome (Appelt & Sperry 2007). The monitoring of stun quality in abattoirs is based largely on evaluation of the physical signs of consciousness, and an animal can be presumed to be insensitive when it does not show reflexes or reactions to stimuli such as sound, odour, light or physical contact (EC 2009). Legislation states that sticking should commence as soon as possible to reduce recovery risk (EC 1993). However, under commercial conditions, it may be difficult to quantify this risk in the event that certain symptoms are displayed. To properly assess stun quality, the adequacy of the stunning equipment and procedure must first be confirmed. In addition, signs of sensibility or awareness must be properly identified and the risk to animal welfare calculated so appropriate action (ie re-stunning) can be taken. Although symptoms such as failure to collapse, rhythmic breathing, blinking, corneal reflexes, righting reflexes, vocalisations, nystagmus and eyeball rotations should be absent after captive-bolt stunning (EFSA 2004; Gregory et al 2009), a degree of controversy exists as to the most reliable signs to measure stun effectiveness (Gouveia et al 2009).

In commercial slaughter, it should be possible to ensure adequate stunning in almost 100% of animals (Grandin 1998; Gregory & Shaw 2000). However, recent studies in cattle shot with penetrative bolt weapons confirm otherwise. Von Wenzlawowicz et al (2012) reported 9.2% cattle incorrectly stunned in commercial abattoirs, Gouveia et al (2009), 32%, and Gregory et al (2007), 9%. The last authors also found a higher prevalence of inadequate stunning in bulls, compared with female cattle (16 versus 6%). In abattoirs not equipped with restraint devices to hold