Efficiency of low versus high airline pressure on stunning cattle with penetrating captive bolt guns

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The objective of this study was to assess the efficiency of stunning cattle using pneumatically powered penetrating captive bolt guns operating with low and high airline pressures. A total of 443 animals (304 Zebu and 139 European cattle) were stunned using penetrating captive bolt gun (USSS-1, Jarvis Products Corporation®) operating with low (160-175 psi, N= 82) and high (190 psi, N= 363) airline pressure. The signs of brain function (rhythmic respiration, corneal and palpebral reflex, eyeball rotation, response to nostril stimulation, tonic and clonic convulsion, tremor, righting reflex, tongue protrusion and masseter relaxation) were recorded after the animal had rolled out of the stunning pen (GR), just after being hoisted (HO), and at the bleeding rail (BL). Blood extravasation from mouth and nostril was recorded only after animals have being hoisted. Data were subjected to the Fisher exact test (2015 Graphpad Software, Inc.) to compare the effects of the treatments on the signs of brain function responses after cattle stunning. At GR cattle shot with low pressure showed more rhythmic respiration (27 vs. 8%, $P < 0.001$), less tongue protrusion (4 vs. 12%, $P=0.03$) and less masseter relaxation (22 vs. 48%, $P<0.001$). At HO, low pressure caused less blood extravasation (1 vs. 22%, $P<0.001$) and more tonic convulsion (8 vs. 0.3%, $P=0.02$) than high pressure. Also a tendency of more rhythmic respiration for low pressure at HO (5 vs. 1%, $P= 0.06$) and tremor at BL (10 vs. 4%, $P=0.06$) was observed. Therefore, based on these results, high airline pressure should be recommended instead of low airline pressure when stunning cattle with pneumatically powered penetrating captive bolt guns.

Key Words: consciousness signals, shot, pressure recommended, rhythmic respiration