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Measuring the efficacy of flunixin meglumine and meloxicam for lame sows using nociceptive threshold tests

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Abstract

Lameness in breeding swine can cause severe pain leading to on-farm welfare issues and significant economic impacts. Non-steroidal anti-inflammatory drugs including meloxicam and flunixin meglumine are commonly used in veterinary medicine for their analgesic and anti-inflammatory properties. Pressure algometry and thermal sensitivity tests are non-invasive methods to quantify pain sensitivity using nociceptive thresholds to provoke withdrawal responses on lame and sound legs. The objective of this work was to determine the effects of these drugs on nociceptive thresholds in sows induced lame using pressure algometry and thermal sensitivity tests. Lameness was induced in 24 mature, mixed-parity sows using a chemical synovitis model and three treatments were compared: meloxicam (1.0 mg kg⁻¹ PO), flunixin meglumine (2.2 mg kg⁻¹ IM) and sterile saline (IM). Pressure algometry was measured on sound and lame rear legs with three replicates at three landmarks. Thermal sensitivity tests were done on sound and lame rear legs with three replicates using a thermal stimulus at one landmark. From 37 to 72 h after lameness induction, meloxicam- and flunixin meglumine-treated sows tolerated higher pressure algometer nociceptive thresholds compared to saline-treated sows. Changes in thermal nociceptive thresholds were evident at the T_{max} time-points for meloxicam administration and 72 and 168 h post lameness induction for flunixin meglumine-treated sows. In conclusion, flunixin meglumine and meloxicam administration mitigated pain sensitivity in lame sows post lameness induction when pain sensitivity was evaluated with pressure algometry. These analgesic drugs may be a key tool to manage pain associated with lameness.

Keywords: animal welfare, flunixin meglumine, lameness, meloxicam, nociceptive threshold, swine