Veterinary Anaesthesia and Analgesia 2017, **xxx**,

SHORT COMMUNICATION

Evaluation of the effect of mesotherapy in the management of back pain in police working dog

Q6 Q1 João CA Alves[a,b], Ana MMP dos Santos[a] & Ângelo DP Fernandes[c]

[a]Divisão de Medicina Veterinária, Guarda Nacional Republicana, Rua Presidente Arriaga, Lisbon, Portugal

[b]CINAMIL — Military Academy Research Center, Lisbon, Portugal

[c]Vale Referrals, the Animal Hospital, Stinchcombe, Dursley, Gloucestershire, UK

Correspondence: João Alves, Divisão de Medicina Veterinária, Guarda Nacional Republicana, Rua Presidente Arriaga, 9 1200-771 Lisbon, Portugal. E-mail: alves.jca@gnr.pt

Q2 ## Abstract

Objective To evaluate the feasibility and effectiveness of mesotherapy in dogs compared with a positive control group.

Study design Experimental, randomized, blinded study.

Animals Fifteen working police dogs with chronic back pain.

Methods Animals were randomly divided into control (CG; $n = 5$) and treatment groups (TG; $n = 10$). A combination of 140 mg lidocaine, 15 mg dexamethasone and 20 mg thiocolchicoside was administered to group TG along with a 70-day course of a placebo, administered as if it was carprofen. Group CG was administered carprofen for 70 days, at a dose adjusted to their weight. On day 0, they were also administered an intradermal injection of Ringer's lactate. Both groups were allowed to rest for 3 days and resumed normal activity over a 5-day period. Response to treatment, measured by the Canine Brief Pain Inventory (CBPI) and the Hudson Visual Analogue Scale (HVAS), was evaluated before treatment (T0), after 15 days (T1) and 1 (T2), 2 (T3), 3 (T4), 4 (T5) and 5 (T6) months. Results were compared using a Mann–Whitney test or a paired samples t test.

Results When comparing CBPI results, no differences were found between groups TG and CG at T0 through T3 and in T6 and T7. Differences were observed in CBPI sections after the discontinuation of carprofen: at T4 [$p = 0.02$ for Pain Interference Score (PIS) and $p = 0.03$ for Pain Severity Score (PSS)] and T5 ($p = 0.16$ for PIS and $p = 0.03$ for PSS), with group TG having overall better results. Individual treatment results were considered successful in one dog of group CG (20%), whereas in group TG, success was higher (ranging from 78% at T1 to 22% at T7). No significant differences were registered with the HVAS.

Conclusions and clinical relevance Mesotherapy may be a promising treatment option for canine musculoskeletal-related pain. Further studies are required.

Keywords Canine Brief Pain Inventory, chronic pain, dog, Hudson Visual Analogue Scale, mesotherapy.

Introduction

Back pain results in decreased spinal flexibility and range of motion, leading to pain, stiffness with negative effects on gait, posture, activity and overall performance. Paraspinal soft tissue structures are under a great amount of repetitive stress in working dogs, which can lead to significant healing and remodelling and may lead to diseases such as spondylosis deformans and type II disc disease which can also cause back pain (Steinberg & Coates 2013; Kranenburg et al. 2013).

Mesotherapy is a minimally invasive technique that consists of the application of pharmaceuticals or other substances in small quantities through multipunctures of the dermis. The injection site is the area of the condition being treated. It has a rapid onset of action, since only a small time is required to

Please cite this article in press as: Alves JCA, dos Santos AMMP, Fernandes ÂDP, Evaluation of the effect of mesotherapy in the management of back pain in police working dog, Veterinary Anaesthesia and Analgesia (2017), http://dx.doi.org/10.1016/j.vaa.2017.07.006

reach the intended site, a prolonged local action and a drug-sparing effect is seen. The principal behind it is that the microdeposit produced on the skin allows for a slow release of the substance used to the surrounding tissues (Mammucari et al. 2011). Mesotherapy as a treatment for back pain has been described in humans and horses (Costatino et al. 2011; Denoix & Dyson 2011).

The Canine Brief Pain Inventory (CBPI) was developed as an owner questionnaire which assessed their perception of the impact of chronic pain in their own dog. It has been used to detect improvements in dogs with osteoarthritis that are administered non-steroidal anti-inflammatory drugs (NSAIDs) (Brown et al. 2008). The Hudson Visual Analogue Scale (HVAS) has been found to be repeatable and valid in the assessment of mild to moderate lameness in dogs using force plate analysis as a criterion-reference standard (Hudson et al. 2004).

The objective of this study was to evaluate the feasibility and effectiveness of mesotherapy to reduce back pain in dogs compared with a positive treatment group. We hypothesized that a single session of mesotherapy could reduce pain scores in police working dogs with back pain for a long period of time.

Materials and methods

The study's protocol was approved by the ethical review group of the Association of Veterinary Anaesthetists (Number 2016-002) and complied with the National Institute of Health guidelines for the Humane Care and Use of Animals. Animals were selected from a population of working dogs at the Guarda Nacional Republicana (Portuguese Gendarmerie Canine Unit).

A power calculation to determine sample size was not carried out before the start of the study since preliminary data regarding the use and effect of mesotherapy was not available. Based on the population size and regarding the recommendations made by the ethical review committee, 15 animals were enrolled; more animals were decided to be assigned to the treatment group since the effects of carprofen in the management of osteoarthritis-related pain are well established and those of mesotherapy are not.

Dogs with history, trainer complaints and physical and radiographic examination consistent with back pain were included. Other illnesses were ruled out through physical examination, complete blood count and serum chemistry profile. Animals that presented complaints compatible with joint osteoarthritis underwent radiographic examination and, if verified, were excluded. Animals were excluded if they were undergoing any other type of treatment. Written informed consent was obtained before inclusion into this study.

The dogs were randomly assigned to two groups using the statistical analysis software IBM SPSS Statistics version 20 (IBM, USA). Ten dogs were allocated to mesotherapy group (group TG) and were administered a solution containing a combination of 140 mg of lidocaine (Anestesin; Laboratório Serológico, Portugal), 15 mg of dexamethasone (Vetacort, Vetoquinol, Portugal) and 20 mg of thiocolchicoside (Relmus, Sanofi, Portugal), as described by Denoix & Dyson (2011) (see below). A total solution volume of 30 mL was prepared. They also were administered a 70-day course of a placebo, which had the same physical appearance as Rimadyl, and was administered according to the manufacturer's indications for carprofen. Five dogs were assigned to a positive control group (group CG) and were administered carprofen (Rimadyl; Zoetis, Portugal) for 70 days at a dose adjusted to their weight according to the manufacturer's recommendations. On day 0, they also were administered an intradermal application of Ringer's lactate solution (Lactato de Ringer Viaflo, Baxter, Portugal) as if they were being treated with mesotherapy. Both carprofen and the placebo were packed in a similar fashion.

For the intradermal administration, the hair along the back of the animal was clipped from mid thorax to mid sacral area and the skin disinfected. This area was delineated based on radiographic and clinical observations that corresponded to the area to be treated. The operator used a sterile technique. A solution volume of 0.1 mL was injected at each injection point, using 4 mm, 27 gauge needles (Mesoram, Italy) and a 5-point linear multi-injector (Mesoram, Italy) along the back of the animals in the area corresponding to the caudal thoracic and lumbar spine (the points consistent with physical examination complaints and radiographic signs). Only mild restraint was necessary. Animals were then allowed to rest for 3 days; they resumed normal activity over a period of 5 days (Denoix & Dyson 2011).

All animals were examined by the assisting veterinarian on the day after the procedure and after the 3 days of rest. They were also accompanied by the same veterinarian on the first 5 days of reintroduction of normal activity to assess for signs of back pain, persistent stiffness of gait and changes in posture. If

Please cite this article in press as: Alves JCA, dos Santos AMMP, Fernandes ÂDP, Evaluation of the effect of mesotherapy in the management of back pain in police working dog, Veterinary Anaesthesia and Analgesia (2017), http://dx.doi.org/10.1016/j.vaa.2017.07.006