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SHORT COMMUNICATION

Nerve stimulator-guided sciatic-femoral nerve block in raptors undergoing surgical treatment of pododermatitis

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Abstract

Objective To describe the nerve stimulator-guided sciatic-femoral nerve block in raptors undergoing surgical treatment of pododermatitis.

Study design Prospective clinical trial.

Animals Five captive raptors (*Falco peregrinus*) aged 6.7 ± 1.3 years.

Methods Anaesthesia was induced and maintained with isoflurane in oxygen. The sciatic-femoral nerve block was performed with 2% lidocaine (0.05 mL kg^{-1} per nerve) as the sole intra-operative analgesic treatment. Intraoperative physiological variables were recorded every 10 minutes from endotracheal intubation until the end of anaesthesia. Assessment of intraoperative nociception was based on changes in physiological variables above baseline values, while evaluation of postoperative pain relied on species-specific behavioural indicators.

Results The sciatic-femoral nerve block was feasible in raptors and the motor responses following electrical stimulation of both nerves were consistent with those reported in mammalian species. During surgery no rescue analgesia was required. The anaesthesia plane was stable and cardiorespiratory variables did not increase significantly in response to surgical stimulation. Iatrogenic complications, namely nerve damage and local anaesthetic toxicity, did not occur. Recovery was smooth and uneventful. The duration (mean ± SD) of the analgesic effect provided by the nerve block was 130 ± 20 minutes.

Conclusion and clinical relevance The sciatic-femoral nerve block as described in dogs and rabbits can be performed in raptors as well. Further clinical trials with a control groups are required to better investigate the analgesic efficacy and the safety of this technique in raptors.

Keywords nerve stimulator, raptors, regional anaesthesia, sciatic-femoral nerve block.

Introduction

Pododermatitis (bumblefoot) is a degenerative and inflammatory condition affecting the plantar aspect of avian feet and is particularly common in large raptor species, such as falcons and larger owls, kept in captivity. The medical management of pododermatitis includes treatment of the underlying causes, wound cleaning and, in moderate to severe cases, also surgical debridement of infected and necrotic tissues. The latter can be invasive and requires appropriate pain management.

Despite increasing interest in avian anaesthesia, there have been only a few regional anaesthetic techniques described for birds (Hawkins & Paul-Murphy 2011; Lierz & Korbel 2012). Intra-articular local anaesthetic injections alleviated pain in chickens with experimentally induced arthritis (Hocking et al. 1997). Also, local anaesthetic infiltration techniques have been described in various avian species (Hawkins & Paul-Murphy 2011). Finally,

several studies evaluated the brachial plexus block in birds (Figueiredo et al. 2008; Brenner et al. 2010; da Cunha et al. 2013). Although the aforementioned investigations attained contrasting or contradicting results regarding the efficacy of local anaesthetics in birds, it is reasonable to assume that, as in mammals, the blockade of sensory neurons would provide analgesia and help to prevent or minimize the occurrence of central sensitization in avian species as well (Shaver et al. 2009; Brenner et al. 2010; da Cunha et al. 2013).

To the best of the authors' knowledge, there are no reports on the use of regional anaesthetic techniques for the pelvic limbs in raptors. However, topography and anatomy of the nerves originating from the lumbosacral spinal cord have been investigated in birds, and similarities have been found between the avian and the mammalian peripheral nerve organization (Bennett 1994; Harcourt-Brown 2000). The sciatic-femoral nerve block (SFNB) is a well described anaesthetic technique which has been used successfully in both farm and companion animals (Adami et al. 2011; Campoy et al. 2012).

The aim of the present investigation was to describe the nerve stimulator-guided SFNB technique, as previously reported in dogs and pet rabbits, in raptors undergoing surgical treatment of pododermatitis.

Materials and methods

The trial was performed under permission of the practice where it took place and under signed, written informed owner consent. Five captive raptors (*Falco peregrinus*), four females and one male, aged mean 6.7 ± SD 1.3 years and weighing 1.1 ± 0.4 kg were scheduled for surgical treatment of pododermatitis. None of the raptors had previous history of illness and all of them underwent a preoperative health assessment including physical, copromicroscopic and radiographic examinations and blood laboratory tests. Additionally, a pain score was performed prior to anaesthesia in order to detect pre-existing signs of chronic pain, and obtain baseline values to be used for comparison during post-operative assessments (Appendix 1). All the birds appeared bright and alert on physical examination. Food, but not water, was withheld for 24 hours prior to anaesthesia. After 5 minutes of pre-oxygenation with a tightly fitting face mask, general anaesthesia was induced with 5% isoflurane (Isoba; Intervet, Italy) delivered in 100% oxygen. Immediately after anaesthetic induction, a 26 gauge catheter was placed in one ulnar vein, and a crystalloid solution (lactated Ringer's solution; B/Braun, Italy) was administered intravenously (IV) at a rate of 10 mL kg hour^{-1} (Lierz & Korbel 2012). The raptors were then tracheally intubated with a 2.5 mm internal diameter non-cuffed endotracheal tube and connected to an Ayre's T-piece circuit. The vaporizer setting was adjusted to maintain an adequate anaesthetic depth, judged on the basis of clinical signs (eye globe position, palpebral and corneal reflexes, muscular tone). An electric heating pad (Eickwarm; Eickemeyer, Italy) was used to maintain normothermia. During anaesthesia, a multiparametric monitor (Hp – Philips Chs; Philips Healthcare, Italy), including lead II electrocardiography, pulse oximetry, and capnography was used. Physiological variables, namely heart rate (HR), respiratory rate (fR), end-tidal carbon dioxide concentration ($P_E'CO_2$), arterial oxygen saturation (SpO_2) and cloacal temperature were manually recorded every 10 minutes. The SFNB was performed always by the same operator. To locate the nerves, the anatomical landmarks described by Mahler & Adogwa for dogs (2008) were used. For the femoral nerve block, the raptors were placed in lateral recumbency with the limb to be blocked abducted by 90° and extended caudally (Fig. 1a). After aseptic preparation of the skin, the femoral artery was identified by palpation, and a point just cranial to it, within the quadriceps femoris muscle, was selected as the puncture site. Following, a 22 gauge, 25 mm long, insulated stimulating needle connected to a nerve stimulator (Stimuplex, HNS12; B/Braun, Germany), was inserted and advanced toward the femoral nerve. The positive skin-electrode was placed 5 cm cranial to the needle entry point. The nerve stimulator was set at an initial current of 1.0 mA, applied for 0.1 ms with a 1 Hz frequency. The targeted motor response consisted of contraction of the quadriceps femoris muscle and extension of the stifle. The proximity of the stimulating needle to the nerve was judged adequate when a current of 0.4 mA was still sufficient to elicit the above described response.

For the sciatic nerve block, landmarks were identified by palpation and ink marks were made corresponding to the great trochanter of the femur (GT) and the ischiatic tuberosity (IT). The puncture site was located at approximately one-third of the distance along the GT-IT line, slightly nearer to the GT (Fig. 1b). After aseptic skin preparation, the

