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SHORT COMMUNICATION

Effect of metoclopramide on nausea and emesis in dogs premedicated with morphine and dexmedetomidine

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Abstract

Objective To evaluate whether subcutaneous (SC) metoclopramide (0.2 mg kg^{-1}) administered 30 minutes prior to (T30) or simultaneously with (T0) intramuscular (IM) morphine (0.2 mg kg^{-1}) and dexmedetomidine (0.003 mg kg^{-1}) reduces the incidence of nausea and emesis in healthy dogs.

Study design Prospective, randomized and blinded study.

Animals A total of 45 dogs scheduled for elective procedures.

Methods Dogs were assigned randomly to three groups to be administered SC metoclopramide (0.2 mg kg^{-1}) 30 minutes before (group M30) or simultaneously (group M0) to IM morphine (0.2 mg kg^{-1}) and dexmedetomidine (0.003 mg kg^{-1}). Dogs in the control group (group C) were administered SC saline at T30 and T0. Dogs were observed for 30 minutes after premedication to evaluate signs of nausea (continuous lip-licking and sialorrhoea) and emesis. Signs of pain or discomfort caused by SC injections were also recorded.

Results There were no statistical differences amongst groups for age, body weight and sex. Significantly more dogs developed continuous lip-licking in group C (12/15, 80.0%) compared to dogs in group M30 (1/15, 6.7%) and dogs in group M0 (5/15, 33.3%; $p = 0.0001$ and $p = 0.01$, respectively). Significantly more dogs developed sialorrhoea in group M0 (8/15, 53.3%) and in group C (10/15, 66.7%) compared to dogs in group M30 (2/15, 13.3%; $p = 0.03$ and $p = 0.004$, respectively). Significantly more dogs vomited in group M0 (4/15, 26.7%) and in group C (9/15, 60.0%) compared to dogs in group M30 (0/15, 0.0%; $p = 0.05$ and $p = 0.0003$, respectively). None of the dogs demonstrated signs of pain or discomfort during SC metoclopramide injection.

Conclusions and clinical relevance: Subcutaneous metoclopramide at 0.2 mg kg^{-1} may reduce IM morphine and dexmedetomidine-induced nausea and emesis if administered 30 minutes in advance. It is effective in reducing lip-licking even when administered concurrently with IM morphine–dexmedetomidine.

Keywords dexmedetomidine, dogs, emesis, metoclopramide, morphine.

Introduction

Opioids and α_2-adrenoceptor agonists are widely used in veterinary medicine to obtain sedation and analgesia. Morphine, a full μ-agonist opioid, is commonly administered in dogs alone or in combination with other sedative drugs, to provide perioperative analgesia and sedation (Lamont & Mathews 2007). Dexmedetomidine, the most selective α_2-adrenoceptor agonist, is generally used in small animal practice to achieve sedation, analgesia, muscle-relaxation and anxiolysis (Kuusela et al. 2001). Unfortunately, in dogs, emesis is a common side effect associated with the administration of both opioids (Lamont & Mathews 2007) and α_2-adrenoceptor agonists (Sinclair 2003). Nausea and vomiting during the perioperative period negatively affect the comfort level of veterinary patients and can often be responsible for different complications, including aspiration pneumonia, gastroesophageal reflux and oesophagitis (Hall et al. 2001). For this reason, prevention of nausea and vomiting is attracting more

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attention in veterinary medicine, becoming an important goal for all patients undergoing anaesthetic procedures.

Metoclopramide is a dopamine antagonist that acts centrally as an antiemetic and peripherally as a prokinetic drug (Ramirez & Richter 1993; Wilson et al. 2006) and it may have a role in emesis prevention during the perioperative period. The purpose of this investigation was to evaluate the antinausea and antiemetic effect of subcutaneous (SC) metoclopramide administered to dogs 30 minutes before or simultaneously with an intramuscular (IM) injection of morphine and dexmedetomidine. The hypothesis of this study was that SC administration of metoclopramide (0.2 mg kg^{-1}), 30 minutes before or simultaneously with IM morphine and dexmedetomidine injection, would reduce the incidence of nausea and emesis in healthy dogs. Additionally, the reaction of the dogs to SC injection was observed and signs of pain or discomfort were also recorded.

Materials and methods

Animals

This study was approved by the Association of Veterinary Anaesthesist's Ethical Committee (protocol number 2016-004) and for each dog a written informed consent was acquired from the owner. A total of 45 canine patients were enrolled in this study. A sample size calculation designed to detect a 50% difference in the occurrence of nausea and vomiting between groups, with a statistical power > 80% and an α level of 0.05, was performed. The study included dogs older than 6 months that were healthy or had a mild compensated systemic illness (American Society of Anaesthesiology class I or II) and that were scheduled for elective procedures (neutering surgery or diagnostics). Food was withheld for 12 hours, and water for 3 hours before the beginning of the study. Specific sex and body weight were not inclusion criteria. Exclusion criteria were the presence of signs of nausea, lack of appetite, vomiting, diarrhoea or abdominal pain within the 10 days prior to the clinical evaluation. In addition, brachycephalic dogs were excluded because they have a higher risk of developing complications such as aspiration pneumonia after regurgitation or vomiting.

Study design

This prospective, randomized and blinded study was completed within a 4-week period. At time zero (T0) all dogs were sedated with an IM injection of morphine (0.2 mg kg^{-1}; Morfina Cl; Molteni & C. Alitti Spa, Italy) and dexmedetomidine (0.003 mg kg^{-1}; Dexdomitor; Pfizer, Italy) mixed in the same syringe and injected into the epaxial muscles. Dogs were assigned randomly, using a commercial software program (Microsoft Office Excel 2013; Microsoft Corp, WA, USA), to three groups: M30, M0 and C, consisting of 15 animals each. Dogs in group M30 were administered SC metoclopramide (0.2 mg kg^{-1}; Vomend; Dechra Veterinary Products, Italy) 30 minutes (T30) prior to IM morphine and dexmedetomidine. In these dogs, an SC saline injection was administered at T0. Dogs in group M0 were administered an SC saline injection at T30 and the SC dose of metoclopramide (0.2 mg kg^{-1}) simultaneously with the IM premedication (T0). Dogs in group C, the control group, were not administered metoclopramide, but rather two SC saline injections, one at T30 and one at T0. One researcher was in charge of the preparation of the syringes containing either metoclopramide or saline solution. The syringes were covered externally with tape in a way that did not reveal their contents. A second researcher was then responsible for administering the contents of the syringes to the dogs and for evaluating the presence of signs of nausea (continuous lip-licking and sialorrhoea) and emesis for 30 minutes after premedication. The manifestation of continuous lip-licking, sialorrhoea (collection of clear or frothy fluid around the lips, with or without it dripping from the mouth) and emesis (forceful expulsion of upper abdominal contents through the mouth) were documented as individual signs, and recorded as yes/no variables. Clinical observation of signs of pain or discomfort (vocalization, skin twitching and scratching at the injection site) caused by the SC injections were also recorded.

Statistical analysis

Data between groups were analysed with the Kruskall–Wallis test for age and weight and with the Fisher exact test for all other non-normally distributed variables. All statistical analyses were performed with a statistical software program (SAS Software 9.2 version; Microsoft Windows, NC, USA) and values of $p \leq 0.05$ were considered significant.

Results

All dogs completed the study. There were no differences amongst groups for age ($p = 0.68$), body

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