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SHORT COMMUNICATION

A comparison of low dose tiletamine-zolazepam or acepromazine combined with methadone for pre-anaesthetic medication in cats

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Abstract

Objective To compare the level of sedation, cardiorespiratory changes, and quality of recovery in cats receiving methadone plus either low dose tiletamine-zolazepam or acepromazine for premedication prior to general anaesthesia for neutering.

Study design Prospective, randomized, blinded clinical study.

Animals Twenty cats 0.54 ± 0.12 years-old (mean ± SD), weighing 3.17 ± 0.65 kg (10 male and 10 female).

Methods Cats were allocated randomly to receive intramuscularly either 0.03 mg kg^{-1} acepromazine (ACE) or 3 mg kg^{-1} tiletamine-zolazepam (TZ), both regimens combined with 0.2 mg kg^{-1} methadone for premedication. Sedation was assessed 25 minutes after premedication using a visual analogue scale (VAS) and a simple descriptive scale (SDS). Anaesthesia was induced with alfaxalone and maintained with isoflurane. Physiological parameters were recorded at 1, 3 and 5 minutes post-endotracheal intubation. Recovery from cessation of isoflurane was timed and quality assessed using a SDS and a VAS. Data was analysed with Mann–Whitney *U*-test, students *t*-test, ANOVA or ordinal logistic regression as relevant. Significance was taken as $p < 0.05$.

Results Sedation was more pronounced in TZ than ACE as indicated by higher VAS (67 ± 21 *versus* 13 ± 5) and SDS scores [4 (1–4) *versus* 1 (0–1)]. Following sedation, Heart (HR) and respiratory (f_R) rates did not differ between groups. After anaesthetic induction, at times 1, 3 and 5 HR, systolic arterial pressure and end tidal carbon dioxide were significantly higher and f_R was significantly lower in TZ than ACE. Recovery quality was similar between groups. In both groups, times to extubation, head lift and sternal recumbency were similar, but time (minutes) until standing was significantly longer in TZ (31 ± 16) than ACE (18 ± 11).

Conclusion and clinical relevance Low dose tiletamine-zolazepam combined with methadone provided superior sedation to ACE. Recovery quality was similar, although time to standing was longer.

Keywords acepromazine, methadone, premedication, tiletamine-zolazepam.

Introduction

Tranquilizers and sedatives are used in veterinary practice to facilitate handling and as premedication before general anaesthesia. In a recent feline study, methadone combined with acepromazine resulted in poor sedation and intravenous (IV) catheterization required experienced handlers and the use of a cat bag for restraint (Bortolami et al. 2012).

Tiletamine-zolazepam has been used widely for premedication, sedation, immobilization and general anaesthesia in domestic and non-domestic animals (Lin 1996). Side effects include muscle rigidity, myoclonus, salivation, respiratory depression and prolonged recovery times from anaesthesia (Hellyer et al. 1988; Forsyth 1995). In cats, tiletamine-zolazepam administered at a dose of 5 mg kg^{-1} subcutaneously provided sedation for approximately 20–30 minutes (Forsyth 1995). Cats were able to walk 30–40 minutes after sedation, but were markedly ataxic. Normal ability to walk resumed four hours post-sedation.

In our experience, low dose tiletamine-zolazepam combined with an opioid for premedication in cats provides good sedation when given by intramuscular (IM) injection and does not result in prolonged recovery times from general anaesthesia. We hypothesized that 3 mg kg^{-1} tiletamine-zolazepam combined with methadone would provide better sedation than acepromazine/methadone and that recovery times and quality would be similar between groups.

Materials and methods

Approval to perform the study was obtained from the Ethics Committee of the Faculty of Veterinary Science, University of Sydney (Protocol number: N00/8-2012/1/5812). Informed owner consent was obtained for all animals prior to inclusion in the study.

Animals

Inclusion criteria for the study were: age >3 months old and, based on clinical examination, ASA (American Society of Anesthesiologists) physical status classification 1 or 2. Cats were admitted to the hospital in the morning and left undisturbed for 15 minutes. They had been fasted overnight and water was available until the time of premedication.

Anaesthetic technique

The cats were observed undisturbed within their cage before pre-anaesthetic medication. Respiratory rate (f_R) was taken by direct observation of thoracic excursions and heart rate (HR) by auscultation. Temperaments were scored on an SDS scale (Appendix S1a) of 1 (quiet) to 4 (most difficult) based on their response to being examined and restrained (Zaki et al. 2009). Cats were allocated randomly (computer generated random numbers) into one of two groups for premedication: group ACE received acepromazine (ACP 2; Delvet, NSW, Australia) 0.03 mg kg^{-1} combined with methadone (Physeptone; Sigma Pharmaceuticals, Vic., Australia) 0.2 mg kg^{-1}; group TZ received 3 mg kg^{-1} tiletamine-zolazepam (Zoletil; Virbac, NSW, Australia) combined with methadone 0.2 mg kg^{-1}. The drug combinations were administered by IM injection into the lumbar epaxial muscles. One anaesthetist administered the premedicant and a second anaesthetist (unaware of the treatment group) induced and maintained anaesthesia in all cases, and also performed all assessments and scores. After premedication, the cats were kept in a dark quiet environment.

Approximately 25 minutes later, the degree of sedation was assessed. A 22 gauge cannula was placed into a cephalic vein by final year students under supervision. Cats were restrained by an anaesthetic nurse. Sedation was scored using a SDS scale (Appendix S1b) of 0 (no sedation) – 5 (recumbent no response to stimulation) (Biermann et al. 2012) and a VAS scale, where fully conscious was scored as 0 mm and unconsciousness as 100 mm. Ease of restraint for IV catheter placement was assessed using a SDS (Appendix S1c) of 0 (impossible to catheterize) – 3 (no response) (Bortolami et al. 2012). Anaesthesia was induced with alfaxalone (Alfaxan; Jurox, NSW, Australia) administered IV to effect over approximately 1 minute until the jaw was sufficiently relaxed to allow desensitization of the vocal folds with 0.2 mL 4% lidocaine (Xylocaine 4% Topical; AstraZeneca, NSW, Australia). Thirty seconds later endotracheal intubation was performed by the primary investigator. The dose of alfaxalone was recorded.

The endotracheal tube was attached to a coaxial Bain breathing system delivering oxygen at a flow rate of 300 mL kg^{-1} per minute with isoflurane (IsoFlo; Abbott Australasia, NSW, Australia) delivered via a precision vaporiser. The initial vaporizer setting was 2% which was then adjusted according to clinical requirements. Heart rate and f_R and were recorded immediately prior to induction (pre-induction) and at 1, 3 and 5 minutes post-intubation (times 1, 3 and 5 respectively). Additionally, end tidal carbon dioxide ($P_E'CO_2$), saturation of arterial haemoglobin (SpO_2) and Doppler (Model 811-B, Parks Medical Electronics Inc., OR, USA) measurements of systolic arterial pressure (SAP) were recorded at times 1, 3 and 5 minutes (Cardell MAX