

## **Clinical evaluation of intranasal benzodiazepines, alpha-agonists and their antagonists in canaries.**

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**OBJECTIVE:** To evaluate the effects of intranasal benzodiazepines (midazolam and diazepam), alpha(2)-agonists (xylazine and detomidine) and their antagonists (flumazenil and yohimbine) in canaries. **STUDY DESIGN:** Prospective randomized study. **ANIMALS:** Twenty-six healthy adult domesticated canaries of both sexes, weighing 18.3 +/- 1.0 g. **METHODS:** In Study 1 an attempt was made to determine the dose of each drug that allowed treated canaries to be laid in dorsal recumbency for at least 5 minutes, i.e. its effective dose. This involved the evaluation of various doses, during which equal volumes of the tested drug were administered slowly into each nostril. In study 2 the onset of action, duration and quality of sedation induced by each drug at its effective dose were evaluated. The efficacy of flumazenil and yohimbine in antagonizing the effects of the sedative drugs was also studied. **RESULTS:** In study 1 administration of 25 microL per nostril diazepam (5 mg mL(-1) solution) or midazolam (5 mg mL(-1) solution) to each bird caused adequate sedation within 1-2 minutes; birds did not move when placed in dorsal recumbency. After administration of 12 microL per nostril of either xylazine (20 mg mL(-1)) or detomidine (10 mg mL(-1)), birds seemed heavily sedated and assumed sternal recumbency but could not be placed in dorsal recumbency. Higher doses of xylazine (0.5 mg per nostril) or detomidine (0.25 mg per nostril) prolonged sedation but did not produce dorsal recumbency. In study 2 in all treatment groups, onset of action was rapid. Duration of dorsal recumbency was significantly longer ( $p < 0.05$ ) with diazepam (38.4 +/- 10.5 minutes) than midazolam (17.1 +/- 2.2 minutes). Intranasal flumazenil (2.5 microg per nostril) significantly reduced recumbency time. Duration of sedation was longer with alpha(2)- agonists compared with benzodiazepines. Detomidine had the longest duration of effect (257.5 +/- 1.5 minutes) and midazolam the shortest (36.9 +/- 2.4 minutes). Nasally administered flumazenil significantly reduced the duration of sedation with diazepam and midazolam while yohimbine (120 microg per nostril) effectively antagonized the effects of xylazine and detomidine. **CONCLUSION:** Intranasal benzodiazepines produce rapid and effective sedation in canaries. Intranasal alpha(2) agonists produce sedation but not sustained recumbency. Specific antagonists are also effective when used by this route. Clinical relevance Intranasal sedative drug administration is an acceptable alternative method of drug delivery in canaries.

### **Subject Headings**

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