Effect of acepromazine or xylazine on tear production as measured by Schirmer tear test in normal cats

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Abstract

Objective To evaluate the effect of acepromazine or xylazine on Schirmer tear test 1 results in clinically normal cats.

Animals Sixteen healthy cross-breed cats.

Procedure The animals were randomly divided into two groups of eight cats each. The first group was sedated with acepromazine alone (0.2 mg/kg) and the second group received only xylazine (2 mg/kg). All cats had Schirmer tear test (STT) readings taken prior to sedation and at 15 and 25 min postsedation.

Results Sedation with acepromazine or xylazine in cats with normal pre-sedation STT 1 values caused a statistically significant decrease in mean values of tear production in both groups. In acepromazine group the mean ± SEM STT at T 15 and T 25 were 4.31 ± 0.98 (P < 0.001) and 5.18 ± 1.07 (P = 0.002). The post-treatment mean ± SEM values in xylazine group were 2.18 ± 0.97 (P < 0.001) and 2.62 ± 1.17 (P = 0.001) at 15 and 25 min respectively. Comparison between T 15 and T 25 in acepromazine group (P = 0.49) and xylazine group (P = 0.56) revealed no significant differences.

Conclusion These observations indicate that both acepromazine or xylazine significantly reduced tear production in clinically normal cats. In cats, clinicians should measure STT values prior to utilizing acepromazine or xylazine as sedatives in order to accurately assess the results. Moreover, sterile ocular lubricant or tear replacement should be used as a corneal protectant during sedation with these drugs.

Key Words: acepromazine, cat, Schirmer tear test, tear production, xylazine

INTRODUCTION

Sedatives are commonly administered to assist the clinician in routine ocular examination to decrease stress associated with ocular examination and enhance safety to both the patient and examiner. It is important to understand the possible unintended effects of these drugs on ocular tear production. Anesthetic and pre-anesthetic agents are known to cause reduction in tear production.1–4 To date, no work has been published regarding the effects of sedatives such as acepromazine or xylazine on Schirmer tear test (STT) results in cats. In the present investigation, the effects of acepromazine or xylazine on tear production were evaluated using the STT 1 in clinically normal cats.

MATERIALS AND METHODS

Sixteen sexually intact cross-bred domestic short hair cats (eight males and eight females) were used in this study. Age of the cats ranged between 12 and 18 months. Prior to the study, complete physical examinations, complete blood counts (CBC) and ophthalmic examinations including, indirect ophthalmoscopy, slit-lamp biomicroscopy, STT and fluorescein staining of both eyes were performed. The animals were randomly divided into two groups of eight (G1 and G2). STT 1 tear test was performed by inserting standard sterile Schirmer tear test strip in the ventral conjunctival fornix for 60 s (OPHITECHNICS INC., Carson City, NV, USA). Tearing rate was reported as the length of strip in millimeters wettened in 1 min. Baseline STT values were recorded just before administration of sedation in both groups.

All cats in group G1 received intramuscular acepromazine (0.2 mg/kg). Cats in group G2 received intramuscular xylazine (2.0 mg/kg). The STT was measured 15 and 25 min after administration of sedation in both treatment groups.

Statistical analysis was performed by using the software package spss 15.0 for windows. Data reported as mean ± SEM where each eye in an animal was treated as a replicate (n = number of animals in each group). An independent samples t-test was used to determined pre-treatment
differences between treatment groups. Post-treatment differences within treatment groups were evaluated using a paired samples t-test. A P-value of <0.05 was considered statistically significant.

RESULTS

The mean values of tear production in both treatment groups are depicted in Fig. 1. All data were expressed in units of based on mm/min. The mean ± SEM baseline STT values for cats in group G1 (acepromazine group) and G2 (xylazine group) were 10.81 ± 0.81 and 13.93 ± 1.18 respectively. For baseline STT values, there was significant difference between two treatment groups (P = 0.047). Significant decrease in mean STT values was observed in both treatment groups at T15 and T25 in comparison to the baseline values. In group G1 the mean ± SEM STT at T15 and T25 were 4.31 ± 0.98 (P < 0.001) and 5.18 ± 1.07 (P = 0.002) respectively. The post-treatment mean ± SEM STT values in group G2 were 2.18 ± 0.97 (P < 0.001) and 2.62 ± 1.17 (P = 0.001) at 15 and 25 min respectively. The greatest decrease in STT values was at 15 min postdrug administration in both groups. Comparison between T15 and T25 in acepromazine group (P = 0.49) and xylazine group (P = 0.56) revealed no significant differences.

Statistical comparisons between post-treatment values of xylazine and acepromazine groups indicated no significant differences at T15 and T25. P-values included 0.147 and 0.130 respectively.

DISCUSSION

This study evaluated the effects of commonly used sedatives such as acepromazine or xylazine on tear production as measured by STT in clinically normal cats. The baseline STT (mean ± SEM), prior to sedation was 10.81 ± 0.81 (acepromazine group) and 13.93 ± 1.18 (xylazine group). The reported range for STT results in normal cats is 3–32 mm in 1 min.

In the present study, STT values decreased by an average of 6.5 mm/min or 60.1% in comparison to the baseline value 15 min after treatment with acepromazine in group G1. There was an even greater average decrease in STT values in the xylazine group (G2) of 11.5 mm/min, or 84.3% compared with baseline. These observations indicated that both acepromazine and xylazine significantly reduced tear production in clinically normal cats.

Our findings were contradictory with previous work carried out in dogs where no significant changes were found in tear production values following administration of xylazine. In that study, intramuscular injection of xylazine reduced tear production in dogs only when combined with opioids, whereas injection of xylazine alone had no significant effect. A combination of acepromazine and opioid also led to a significant reduction in tear production, but the effect of acepromazine alone on tear production in dogs has not been investigated. The exact mode of action of acepromazine and xylazine in decreasing lacrimation in cats is unclear. However, the cardiovascular effects of these sedatives may affect tear production. Acepromazine is a neuroleptic agent, commonly used in veterinary medicine prior to anesthesia for tranquilization and to prevent drug-induced arrhythmias. The primary mechanism of acepromazine is postsynaptic inhibition of central dopamine receptors causing depression of the respiratory rate, heart rate, blood pressure, and body temperature. Xylazine is an alpha-2-adrenoceptor agonist. These drugs may be classified as sedative/hypnotics and have additional muscle-relaxant and analgesic properties. As with acepromazine, xylazine administration also decreases heart rate by enhancing vagal tone and baroreceptor reflexes. Moreover, the alpha-2-agonists have some effects on vascular tone. Activation of peripheral postsynaptic alpha-1 and alpha-2 receptors leads to vasoconstriction. Dodman’s study suggested that STTI readings were lower under the effects of sedative-opioid combinations because of one or more of the following mechanisms: central effects of these drugs on autonomic regulation of tear production, effective antinociception, vasoconstriction at the tear gland itself, and altered metabolism at the gland’s cellular level.

Tears play an important role in maintaining the health and normal function of the conjunctiva and cornea. Deficiency in tear production results in inflammation of the conjunctiva and cornea known as keratoconjunctivitis sicca. Several drugs can reduce tear production in the dog and cat, and their effects may be immediate or a more gradual onset with long-term keratoconjunctivitis sicca. Sedatives are known to have an immediate effect on tear secretion in dogs but the effects of sedative administration on STT results of the cat has not been reported to date.

In summary, this study supports that sedatives such as acepromazine and xylazine decrease tear production shortly after intramuscular administration in cats. In cats, clinicians should measure STT values prior to utilizing acepromazine or xylazine as sedatives in order to accurately assess the results. Moreover, sterile ocular lubricant or tear replacement should be used as a corneal protectant during sedation with these drugs.

Figure 1. Schirmer tear test (STT) results in acepromazine and xylazine groups at baseline, 15 and 25 min postdrug administration.

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REFERENCES


