Effect of brimonidine and brimonidine-timolol on intraocular pressure in normal equine eyes

Melissa T. Von Zup1, Mary Lassaline2, Paul E. Miller2, Lola B. Davis3, Sara M. Thomasy1

Department of Surgical and Radiological Sciences, School of Veterinary Medicine, University of California, Davis, CA2.
University of Wisconsin-Madison, Madison, WI2.

Introduction

- Glaucoma is a disease that results in damage to the optic nerve and is associated with increased intraocular pressure (IOP).
- Glaucoma is painful and often results in blindness and enucleation in horses. Currently, there are few effective treatment options for equine glaucoma.
- Brimonidine is an alpha 2-agonist that decreases aqueous humor production and increases uveoscleral or non-conventional outflow in human studies.
- Timolol is a beta-agonist that decreases aqueous humor production and is an effective agent at decreasing IOP in horses.
- Brimonidine and timolol have been shown to have a synergistic effect on IOP in human studies.
- The purposes of this study was to compare the effect of brimonidine and brimonidine-timolol on IOP and assess the safety of these medications in equine eyes.
- We hypothesized that brimonidine-timolol would be most effective at decreasing IOP.

Methods

- The study utilized 16 horses (10 geldings, 6 mares) with a median (range) age of 11.5 (7-18) years. The breeds included were Thoroughbred (n = 13), Warmblood (n = 2), and Quarter horse (n=1).
- The horses were divided into 2 groups of 8. Each group underwent two 10-day trials separated by an 18 day washout period.
- Throughout the ten days, IOP was measured three times a day (7 am, 1 and 7 pm) using rebound tonometry (iCare Tonovet).
- Tolerance of the medication was evaluated by measuring vertical pupil size with a caliper and scoring conjunctival hyperemia twice daily (7 am and 1 pm).
- The initial three days of each trial consisted of baseline IOP and safety measurements without treatment, followed by five days of treatment in addition to the measurements. Horses received brimonidine or brimonidine-timolol in one eye and balanced salt solution (BSS, control) in the other eye. Medication was discontinued for the final two days of measurement.
- Following the washout period, the drug each horse received was switched and the 10-day trial was repeated.

Conclusion

- Preliminary data analysis did not show a consistent change in IOP with brimonidine or brimonidine-timolol treatment. However, further statistics are warranted to determine if individual horses responded to either treatment.
- A consistent diurnal change in IOP was observed in most horses with the highest measurements in the afternoon (1 pm)
- Brimonidine and brimonidine-timolol were well tolerated in horses with no conjunctival hyperemia observed or obvious change in pupil size. Further statistical analysis are warranted to determine if changes in pupil size occurred in individual horses.

Acknowledgements

This study was supported by the Center for Equine Health, NIH grant K08EY021142 and the Merial Veterinary Scholars Program.