Comparison of Intraocular Pressure Measurements between Tonopen Vet and TonoVet in Dutch Belted Rabbits

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Abstract

Dutch Belted rabbits are commonly used for the evaluation of topical drugs to lower intraocular pressure (IOP). The accuracy of IOP measurements, being therefore critical in the analysis of data and subsequent extrapolation to humans, depends on the tonometers and techniques. The purpose of this study was to establish the most reliable technique, from two currently available veterinary tonometers, Tonopen Vet and TonoVet, of measuring IOP in Dutch Belted rabbits.

METHODS: The IOP measurements of 305 healthy male Dutch Belted rabbits were performed at 9:00AM in the morning and at 3:00PM in the afternoon with the TonoVet (Medtronic Ophthalmic, Jacksonville, FL, USA) and TonoVet (Joanne Finland, Panorama Tower, Finland). The mean IOP measurements of TonoVet in 8:30AM and 3:00PM were averaged manually from three continuous readings. The measurement range of Tonopen Vet is 5-28 mmHg and the measurement range of TonoVet is 1-30 mmHg.

RESULTS: All IOP measurements were analyzed by the Student’s t-test and the One-way ANOVA. After the IOP measurement, the cornea was examined fluorescent staining by a Slit-Lamp. There is no significant difference (p>0.05) between 9:00AM and 3:00PM in the left eye or in the right eye at 9:00AM or at 3:00PM either using Tonopen Vet or using TonoVet. There is no significant difference (p>0.05) between 9:00AM and 3:00PM in the left eye and 21.70 ± 2.01 mmHg in the right eye at 3:00PM in the afternoon. The mean IOP measurements with Tonopen Vet were 21.66 ± 2.11 mmHg in the left eye and 21.77 ± 2.01 mmHg in the right eye at 3:00PM in the afternoon. The mean IOP measurements with TonoVet were 23.90 ± 2.77 mmHg in the left eye and 23.73 ± 2.73 mmHg in the right eye at 9:00AM in the morning. The mean IOP measurements with TonoVet were 23.50 ± 2.47 mmHg in the left eye and 21.70 ± 2.36 mmHg in the right eye at 3:00PM in the afternoon.

CONCLUSIONS: The mean baseline IOP in Dutch Belted rabbits was 23.7 ± 2.34 mmHg, Both Tonopen Vet and TonoVet tonometers were reliable for measuring IOP in Dutch Belted rabbits without obvious corneal damage.

Introduction

Dutch Belted rabbits are commonly used for the evaluation of topical drugs to lower intraocular pressure (IOP). The accuracy of IOP measurements, being therefore critical in the analysis of data and subsequent extrapolation to humans, depends on the tonometers and techniques. The purpose of this study was to establish the most reliable technique, from two currently available veterinary tonometers, Tonopen Vet and TonoVet, of measuring IOP in Dutch Belted rabbits. There is no significant difference (p>0.05) between 9:00AM and 3:00PM in the left eye or in the right eye at 9:00AM or at 3:00PM either using Tonopen Vet or using TonoVet. There is no significant difference (p>0.05) between 9:00AM and 3:00PM in the left eye and 21.70 ± 2.01 mmHg in the right eye at 3:00PM in the afternoon. The mean IOP measurements with Tonopen Vet were 21.66 ± 2.11 mmHg in the left eye and 21.77 ± 2.01 mmHg in the right eye at 3:00PM in the afternoon. The mean IOP measurements with TonoVet were 23.90 ± 2.77 mmHg in the left eye and 23.73 ± 2.73 mmHg in the right eye at 9:00AM in the morning. The mean IOP measurements with TonoVet were 23.50 ± 2.47 mmHg in the left eye and 21.70 ± 2.36 mmHg in the right eye at 3:00PM in the afternoon.

CONCLUSIONS: The mean baseline IOP in Dutch Belted rabbits was 23.7 ± 2.34 mmHg, Both Tonopen Vet and TonoVet tonometers were reliable for measuring IOP in Dutch Belted rabbits without obvious corneal damage.

Results

Tonopen Vet in 573 DB Rabbits

There is no significant difference (p>0.05) between 9:00AM and 3:00PM in the morning and afternoon or in the left and right eyes using Tonopen Vet in 573 DB Rabbits.

TonoVet in 50 DB Rabbits

There is no significant difference (p>0.05) in IOP measurement in the morning and afternoon or in the left and right eyes using TonoVet and Tonopen Vet in 50 DB Rabbits.

Tonopen Vet and TonoVet in 305 DB Rabbits

There is no significant difference (p>0.05) in IOP measurement in the morning and afternoon or in the left and right eyes using Tonopen Vet and Tonopen Vet in 305 DB Rabbits.

Ocular Examination

Total 305 Dutch Belted rabbits were measured IOP, only 8 rabbits had light fluorescein staining on cornea after IOP measurement. All IOP measurements were analyzed by the Student’s t-test and the One-way ANOVA. After the IOP measurement, the cornea was examined fluorescent staining by a Slit-Lamp. There is no significant difference (p>0.05) between 9:00AM and 3:00PM in the left eye or in the right eye at 9:00AM or at 3:00PM either using Tonopen Vet or using TonoVet. There is no significant difference (p>0.05) between 9:00AM and 3:00PM in the left eye and 21.70 ± 2.01 mmHg in the right eye at 3:00PM in the afternoon. The mean IOP measurements with Tonopen Vet were 21.66 ± 2.11 mmHg in the left eye and 21.77 ± 2.01 mmHg in the right eye at 3:00PM in the afternoon. The mean IOP measurements with TonoVet were 23.90 ± 2.77 mmHg in the left eye and 23.73 ± 2.73 mmHg in the right eye at 9:00AM in the morning. The mean IOP measurements with TonoVet were 23.50 ± 2.47 mmHg in the left eye and 21.70 ± 2.36 mmHg in the right eye at 3:00PM in the afternoon.

CONCLUSIONS: The mean baseline IOP in Dutch Belted rabbits was 23.7 ± 2.34 mmHg, Both Tonopen Vet and TonoVet tonometers were reliable for measuring IOP in Dutch Belted rabbits without obvious corneal damage.

Summary

All IOP measurement range was 16.28-30.37 mmHg and the mean IOP of all measurements was 21.61 ± 2.01 – 2.73 mmHg in 305 DB Rabbits.

The mean IOP measurements using TonoVet were 21.53 ± 2.71 ± 2.09 – 2.30 mmHg in 173 DB Rabbits.

The mean IOP measurements using TonoVet were 21.34 ± 21.57 ± 3.12 – 5.03 mmHg in 82 DB Rabbits.

The mean IOP measurements using TonoVet and Tonopen Vet were 19.39–21.32 ± 3.79 – 6.40 mmHg in 50 DB Rabbits.

Both Tonopen Vet and TonoVet tonometers were measured IOP in DB rabbits without obvious corneal damage.

Conclusion

There is no significant difference (p>0.05) in IOP measurement in the morning and afternoon or in the left and right eyes using Tonopen Vet and Tonopen Vet in 305 DB Rabbits. Both Tonopen Vet and TonoVet tonometers were reliable for measuring IOP in DB rabbits without obvious corneal damage.

Reference