Cosinor rhythmometry of iCare HOME intraocular pressure identifies responders to glaucoma medications: timolol and latanoprost

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Purpose

Current glaucoma management relies on trial-and error with intraocular pressure (IOP) measured only during office hours. This limits our understanding of drug responses over a diurnal period. iCare HOME, a self-tonometer, may address this issue. This study examined timolol and latanoprost responders using diurnal IOP data from iCare HOME via cosinor rhythmometry.

Methods

Forty-seven subjects (22 male, mean age 61±9 years) with ocular hypertension or open-angle glaucoma, were enrolled in a prospective, randomized, crossover trial of latanoprost and timolol. IOP was measured using pneumatonometry and iCare IC200 at 3 of 6 study visits: baseline, after 1 week of first treatment, and after 1 week of second treatment. Subjects measured their IOP with iCare HOME at least 6 times daily for 1 week before visits. Eyes were labeled responders to timolol or latanoprost if IOP decreased ≥15% from baseline. The 24-hour IOP means were derived using the Midline Estimating Statistic of Rhythm (MESOR), calculated via cosinor modeling in R (Figure 1).

Results

For timolol, iCare HOME and pneumatonometry identified the same eye as a responder or non-responder in 60.4% of eyes (n=53). For latanoprost, the two tonometers agreed in 69.6% of eyes (n=56). Agreement between iCare HOME and iCare IC200 occurred in 54.5% of eyes (n=55) for timolol and 62.1% of eyes (n=58) for latanoprost (Figure 2).

The chi-squared test for independence revealed that classifications of latanoprost responders between iCare HOME and the clinic tonometers, pneumatonometry (p=0.0025) and iCare IC200 (p=0.0137), were significantly different. No such difference was found with timolol responder classification.

Conclusions

When determining timolol responders, home and clinic tonometers show comparable classifications. For latanoprost, significant differences in classifications highlight discrepancies between home and clinic tonometry, suggesting that incorporating 24-hour monitoring may impact classifications. iCare HOME may improve glaucoma management by capturing IOP fluctuations to better identify responders.