A new rebound tonometer for home monitoring of intraocular pressure.

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Source

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Abstract

BACKGROUND: To compare intraocular pressure (IOP) measurements obtained by the icare ONE rebound tonometer (RTONE) and the Goldmann applanation tonometer (GAT) in healthy persons and glaucoma patients in a prospective study, and to investigate the influence of central corneal thickness (CCT).

METHODS: Measurements on 126 right eyes were obtained by three equally skilled ophthalmologists with each of the above-mentioned tonometers. In addition, patients measured their own IOP with the RTONE (RTONE(p)). The means and standard deviation for all tonometers were compared. Agreement between the tonometers was calculated using the Bland-Altman method.

RESULTS: A total of 95 (75.3%) patients were able to perform correct self-tonometry. Mean IOPs obtained were 17.1 ± 5.9 mmHg (RTONE performed by ophthalmologist: RTONE (o)), 17.3 ± 5.6 mmHg (RTONE(p)) and 16.5 ± 5.1 mmHg (GAT). Correlation analysis indicated a good correlation between IOP readings obtained using RTONE(o) and RTONE(p) (ρ = 0.916; p < 0.001) and RTONE(o) and GAT (ρ = 0.901; p < 0.001). Bland-Altman analysis revealed a mean difference (bias) between RTONE(o) and RTONE(p), between RTONE(o) and GAT, and between RTONE(p) and GAT of -0.2, 0.6, and 0.8 mmHg, respectively, with 95% limits of agreement of -5.0 to 4.5, -4.4 to 5.6, and -4.6 to 6.1 mmHg, respectively. The difference between RTONE(o) and GAT significantly increased with increasing CCT (ρ = 0.004), with a 10% increase in CCT resulting in a 1.8% increase in the difference.

CONCLUSIONS: Measurements obtained with the RTONE, either by an ophthalmologist or by the patient, showed an excellent correlation with those provided by applanation tonometry. RTONE generally tends to overestimate IOP compared to GAT readings and displays a dependence on CCT. This study was registered with the DRKS (German Clinical Trials Register; www.germanctr.de; DRKS00000478).

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