

COMPARISON OF INTRAOCULAR PRESSURE MEASUREMENTS WITH THE REICHERT® PT100, THE KEELER® PULSAIR INTELLIPUFF PORTABLE NON CONTACT TONOMETERS AND GOLDMANN APPLANATION TONOMETRY

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ABSTRACT

Purpose: To compare the intraocular pressure (IOP) measurements by two portable tonometers, the Keeler Pulsair Intellipuff and the Reichert PT100, with Goldmann applanation tonometry (GAT). To evaluate the influence of central corneal thickness (CCT) on IOP measurements.

Design: Prospective cross-sectional study.

Methods:

Setting: Department of Ophthalmology, University Hospital of Grenoble.

Study population: Normotensive and hypertensive patients recruited from the outpatient clinic. Inclusion criteria were men or women, aged over 18, able to understand the instructions and to give an informed consent. Exclusion criteria were corneal disease and corneal surgery in the past six months.

Procedures: IOP was measured by the Keeler Pulsair Intellipuff, the Reichert PT100 and GAT in one eye of each patient and in a random order. CCT was measured with the Accutome PachPen pachymeter.

Statistics: Linear regression and Pearson coefficient were used to evaluate the correlation among the methods, and Bland-Altman plots were used to evaluate the agreement.

Main outcomes measures: Average of three IOP measurements with each tonometers and CCT.

Results: 137 eyes of 137 patients were included. The mean \pm SD IOP measurements were 17.91 ± 8.90 mmHg, 19.60 ± 9.62 and 20.81 ± 11.91 mmHg with the GAT, the Intellipuff and the PT100 respectively. Measurements by the two non-contact tonometers were significantly correlated with GAT (Intellipuff $r = 0.92$, $p < 0.001$; PT100 $r = 0.92$, $p < 0.001$). The agreement between the Intellipuff and GAT was better than between the PT100 and GAT (Intellipuff – GAT: median of the difference 1.67, tenth percentile - 1.33, ninetieth percentile 4.13; PT100 – GAT: median of the difference 1.67, tenth percentile - 0.67, ninetieth percentile

9.33). The PT100 significantly overestimated more the IOP in case of IOP > 20 mmHg, whereas the Intellipuff did not (correlation between PT100 – GAT and the mean of PT100 and GAT, $r = 0.57$, $p < 0.0001$; correlation between Intellipuff – GAT and the mean of Intellipuff and GAT, $r = 0.06$, $p = 0.453$). The differences between the measurements of the two non-contact tonometers and the GAT were significantly correlated to the central CCT (correlation between PT100 – GAT and CCT, $r = 0.21$, $p = 0.013$; correlation between Intellipuff – GAT and CCT, $r = 0.20$, $p = 0.021$).

Conclusions: The Intellipuff non-contact tonometer agrees significantly better with GAT than the PT100 non-contact tonometer, particularly in hypertensive and glaucomatous patients. As non-contact tonometry is usually used for ocular hypertension and glaucoma screening, these findings should be considered.