Interobserver and interdevice agreement between ophthalmologists using the reusable Goldmann applanation prism, the tonosafe disposable prism and the dynamic contour tonometer

Csilla Ajtony¹, Aachal Kotecha², Ahmed Elkarmouty¹, Keith Barton²
¹Glaucoma Service, Moorfields Eye Hospital NHS Trust, London - United Kingdom
²NIHR Biomedical Research Centre for Ophthalmology, UCL Institute of Ophthalmology and Moorfields Eye Hospital NHS Foundation Trust, London - United Kingdom

Purpose: To compare agreement between ophthalmologists measuring intraocular pressure (IOP) using the reusable Goldmann applanation prism, the Tonosafe disposable prism and the Dynamic Contour tonometer (DCT).

Methods: In this pragmatic clinical study patients had masked IOP measurements in one eye by 2 ophthalmologists, taken from a mixture of ophthalmologists who were experienced in applanation tonometry, but less experienced with DCT. The order of tonometers and observers was randomised. Agreement was calculated by Bland-Altman analysis, showing the mean difference (MD) and 95% limits of agreement (LoA) of measurements.

Results: Data for 100 eyes was collected. Mean difference [LoA] between observers for each tonometer was: Reusable Goldmann prism = -0.3 [5.4] mmHg; Tonosafe prism = -0.25 [4.8] mmHg; DCT = 0.68 [7.14] mmHg. Agreement between devices for each doctor group was: Reusable Goldmann v Tonosafe MD[LoA]: doctor 1 = -0.4 [4.9] mmHg, doctor 2 = -0.3 [3.4] mmHg; Tonosafe v DCT: doctor 1 = -4.0 [7.4] mmHg, doctor 2 = -3.1 [8.2] mmHg; Reusable Goldmann v DCT: doctor 1 = -4.4 [8.4] mmHg, doctor 2 = -3.4 [8.1] mmHg.

Conclusions: Agreement between ophthalmologists using the disposable Tonosafe prism is similar to that found using the reusable Goldmann prism. The limits of agreement when using the DCT are much wider than previously reported, and may reflect differences in the case mix/doctor's confidence in using the DCT. It should be noted that all DCT quality scores were included in this analysis, as whilst the ophthalmologist was advised to record scores of quality 3 or better, this was not often achievable.