Evidence Table

Clinical Area: Heidelberg Retina Tomograph (HRT) II
Keywords: HRT II, optic nerve head, stereometric parameters, test-retest variability

Study Type: Cross-sectional.
Study Aim: To study the test-retest reliability of the HRT II.

Outcomes
• Primary: Test-retest variability; factors associated with test-retest variability.

Design
• Number of subjects: n=50 (n=24 patients with glaucoma; n=26 healthy subjects)
• Description of study population: Mean age=46 ± 17 years; 29 males/21 females.
• Inclusion and exclusion criteria: Glaucoma patients were consecutively recruited patients from the glaucoma service at a hospital in India. Glaucoma was defined as an intraocular pressure (IOP) of >21 mm Hg on two separate occasions, glaucomatous visual field defects and optic nerve head changes. Healthy subjects were non-blood-related attendants of patients, and faculty and staff at the glaucoma center. Eyes were considered normal if there was no family history of glaucoma, intraocular pressure (IOP) <21 mm Hg, a normal optic nerve head and normal visual fields. Patients with a history of ocular trauma, uveitis, intraocular surgery or with posterior segment pathology on examination were excluded. Also excluded were eyes with a best-corrected visual acuity worse than 6/12 or ametropia >6D. If both eyes of a patient met the eligibility criteria, one eye was randomly selected for inclusion in the study.
• Procedure: Patients underwent extensive testing to determine whether they met eligibility criteria, and to verify the diagnosis of glaucoma. The optic nerve head was imaged using the HRT II with software version 1.5.0. All imaging was done by a single, experienced observer at an imaging head/eye distance of 10 mm. Three acquired image series were saved, and the three topography images and mean topography image were computed. The process was repeated five times. Patients were instructed to close their eyes while the images were being saved (about five minutes each time).

Validity
• Independent blind comparison with a gold standard or follow-up of those not receiving the gold standard test? No, purpose of the study was test-retest reliability, not test accuracy.
• Was “normal” defined? Yes.
• Appropriate spectrum of disease? Included both normal and glaucomatous eyes.
• Consecutive patients? Yes.
• Methods described in enough detail to enable you to replicate the test? Yes.
• Reproducible results? Yes.
Conclusions regarding validity of methods:
The methods were generally valid for the study purpose, studying the test-retest reliability of the HRT II. A limitation is that the study only examines the reliability of testing conducted at a single sitting by a single observer.

Results
Variability
The authors presented 18 parameters measured by the HRT II during 5 repetitions:
- The Cronbach alpha ranged from 0.9028 to 0.9948 (possible range 0 to 1; generally 0.7 is considered acceptable).
- The Interclass Correlation Coefficient (ICC) ranged from 0.6501 to 0.9746, over 0.9 for 10 out of the 18 parameters (general range 0 to 1).
- The coefficient of variance ranged from 4.25 to 237.96.

Correlation of variability with baseline variables
- There was no significant difference in variability with respect to sex, presence of glaucoma, the laterality of the eye or the linear cup/disc ratio.
- There was a significant difference in variability with respect to age and visual acuity. However, the variability in age was no longer statistically significant when controlling for visual acuity.
- There was significantly greater variability in subjects with cylindrical error ≥ 1 D.

Authors’ Conclusions
“The test-retest variability of Heidelberg Retina Tomograph II stereometric parameters is comparable to that reported for the Heidelberg Retina Tomograph. Eyes with uncorrected astigmatism more than 1 D and poor visual acuity may have a higher variability of Heidelberg Retina II stereometric parameters.”

Reviewer’s Conclusions
Generally, there was a high degree of reliability among a series of five measurements taken with the HRT II for normal and glaucomatous eyes at a single sitting by a single experienced observer. However, even with the automated version of the HRT, there was still variability. The authors did not evaluate reliability over time or variability between observers.