Long-term follow-up with imaging in open angle glaucoma
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Purpose: To compare automated perimetry and imaging in follow-up of glaucoma.

Methods: 45 patients with open angle glaucoma or ocular hypertension (OH) in at least one eye were included for follow-up with visual fields (Humphrey, SITA 24-2) and imaging every 4 months for 2-5 years. Mean values of 3-5 measurements of neuroretinal rim area (NRA with Heidelberg Retina Tomograph) and retinal nerve fiber layer (RNFL) thickness with optical coherence tomography (Stratus OCT) or laser polarimetry (GDxVCC) were analyzed with linear regression. A significant slope over time was accepted as a change in NRA or RNFL. Visual field progression was defined as GPA likely progression and/or a significant slope of MD or VFI. Eyes with transient field changes or significant slopes only on the last two visits were classified as suspicious progression.

Results: 7 patients (16%) were excluded due to unacceptable image quality and 7 withdrew for various reasons before 2 years. For two subjects only one eye was included and 2 developed CRVO in one eye within 2 years. 31 patients that were followed for an average of 4.6 years remained, 18 males and 13 females aged 38 to 83 (average 64) years. 58 eyes were followed for at least 2 years. 37 had glaucoma, based on visual fields and optic discs, 6 OH and 15 were fellow eyes. Among the glaucoma eyes there were 3 normal tension, 3 pigmentary, 14 capsular, and 17 primary open angle glaucomas. 16 eyes of 12 patients showed definite field progression, 8 eyes showed suspicious and 34 no field progression. Among the 16 eyes with field progression 13 (81%) had a significant loss of NRA, 7 (54%) of RNFL thickness with OCT and 6 (38%) with GDxVCC. In 8 eyes with suspicious field loss 7 had a loss of NRA, none of RNFL thickness with OCT but two with GDxVCC. For the 34 eyes without field progression no significant loss was observed in 19 (56%) for NRA, 33 (97%) for OCT and 24 (71%) for GDxVCC. 7 of 15 eyes with a “false positive” loss of NRA had a yearly loss of less than 0.01 mm², a rate of loss that is unlikely to be of clinical significance. Compared to visual field changes a significant loss was generally observed earlier for NRA and later for RNFL thickness. Average time to significant loss was 31 months for NRA, 34 for visual fields, 45 for OCT and 46 months for GDxVCC.

Conclusions: Compared to accepted criteria for visual field progression the 3 imaging instruments seem to differ in capacity to detect disease progression. None of the two instruments to determine RNFL thickness were particularly sensitive and a significant loss of RNFL thickness was on the average observed almost a year later than field progression. Later versions of OCT and GDx are now available and may be more sensitive. NRA determination had high sensitivity but low specificity. Since NRA change is generally seen earlier than visual field progression it seems worthwhile to further explore the possibilities of scanning laser tomography in glaucoma follow-up.