Pfau et al. Light sensitivity within areas of geographic atrophy secondary to age-related macular degeneration

Supplement to

Light sensitivity within areas of geographic atrophy secondary to age-related macular degeneration

Simulation of the expected response distribution for absolute scotomata

Even in the setting of absolute scotomata (complete loss of light sensitivity), measurements of greater than “< 0 dB” (indicates no response by the patient) would be expected to some degree due to false-positive responses. Hereby, the patient-specific rate of false-positive response rate was measured using the Heijl-Krakau method (i.e. presenting suprathreshold stimuli presented to the patient’s blind spot). With consideration of the initial test brightness of each test-point and the device-specific staircase-strategy (4-2), the expected response distribution for absolute scotomata may be determined. Supplemental Figure S1 outlines this for a hypothetical patient. The expected values were derived by simulating the staircase procedure 10,000 times for each test-point with the false-positive response rate serving as probability of a pressure-event at each step. Further, the 95th sensitivity percentile for each test-point was saved. Sensitivity measurements above this percentile may be considered as unlikely under the assumption of an absolute scotoma.
Supplementary Figure S1. Exemplary effect of false-positive responses on the expected response distribution for absolute scotomata

In this hypothetical example, the patient-specific false-positive response rate is 30 % and the initial test brightness for an arbitrary test-point is 4 dB. This mean, that even in the presence of an absolute scotoma, the probability of a pressure event will be 30 % and of no-pressure event will be 70 % for the first step in the staircase procedure. For the second step of the staircase procedure, the most likely outcome will be no response to the brightest (0 dB) stimulus with a total probability of 49 % (i.e. 0.7 [for the first step] x 0.7 [for the second step]), which would end the staircase procedure. However, as visible in panel B, multiple other outcomes at the second step of the staircase procedure are possible due to false-positive responses. Through simulation, the expected response distribution for absolute scotomata can be obtained for each patient for each test-point.
Supplementary Figure S2. Configuration of the inner junctional zone of atrophy without overlay

The figure shows spectral-domain optical coherence tomography (SD-OCT) imaging B-scans of the junctional zone of geographic atrophy (GA). In exemplary B-scan 1, the nasal boundary of GA shows residual outer nuclear layer including Henle's fiber layer (HFL+ONL) as well as an outer retinal tubulation in the region of retinal pigment epithelium (RPE) atrophy. Centrally, a region of residual HFL+ONL is visible. The temporal boundary of GA shows a close proximity of the RPE atrophy boundary and HFL+ONL atrophy boundary. In exemplary B-scan 2, residual HFL+ONL layer bridges the area of RPE atrophy.