Smartphone-based remote monitoring of vision in macular disease enables early detection of worsening pathology and the need for intravitreal therapy

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Aim: To assess the outcomes of home monitoring of distortion caused by macular diseases using a smartphone-based application (app), and to examine them with hospital-based assessments of visual acuity (VA), Optical Coherence Tomography (OCT) derived central macular thickness (CMT) and the requirement of intravitreal injection therapy.

Design: Observational study with retrospective analysis of data

Methods: Participants were trained in the correct use of the app (Alleye, Oculocare Ltd) in person or by using video and telephone consultations. Automated threshold-based alerts were communicated based on a traffic light system. A “threshold alarm” was defined as three consecutive “red” scores, and turned into a “persistent alarm” if present for greater than a 7-day period. Changes of VA and CMT, and the requirement for intravitreal therapy after an alarm were examined.

Results: 245 patients performing a total of 11,592 tests (mean 46.9 tests per user) were included and 85 eyes (164 alarms) examined. Mean drop in VA from baseline was -4.23 letters (95%CI: -6.24 to-2.22; p<0.001) and mean increase in CMT was 29.5 µm (95%CI:-0.08-59.13; p=0.051). Sixty-six eyes (78.5%) producing alarms either had a drop in VA, increase in CMT or both and 60.0% received an injection. Eyes with persistent alarms had a greater loss of VA, -4.79 letters (95%CI: -6.73 to-2.85; p<0.001) or greater increase in CMT, +87.8 µm (95%CI: 5.2-170.4; p=0.038).

Conclusion: Smartphone-based self-tests for macular disease may serve as reliable indicators for the worsening of pathology and the need for treatment.

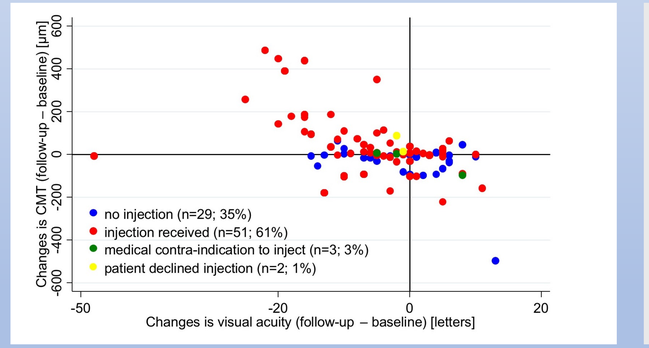


Figure 1: Results by injection outcome

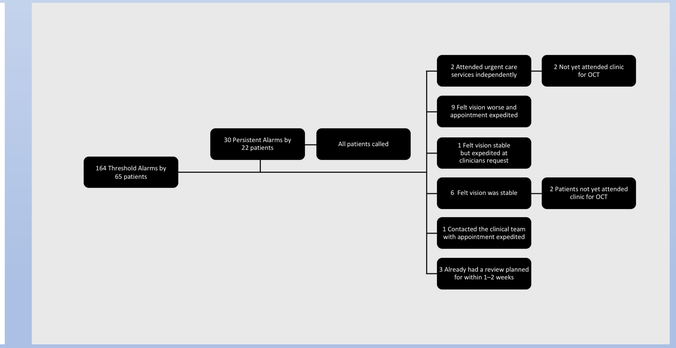


Figure 2: Persistent alarm outcomes.