Association of treatment adherence with real-life VA outcomes in AMD, DME, and BRVO patients.

Ehlken C, Helms M, Böhringer D, Agostini HT, Stahl A.

PURPOSE: Real-life clinical outcomes of patients treated with anti-VEGF drugs for neovascular age-related macular degeneration (nAMD), diabetic macular edema (DME), or macular edema secondary to branch retinal vein occlusion (BRVO) are often inferior to results from randomized clinical trials. This observational cohort study investigates treatment adherence and real-life clinical outcomes within the first year of treatment.

PATIENTS AND METHODS: A total of 708 treatment-naïve patients (466 nAMD, 134 DME, and 108 BRVO) were included. Patients were followed with a PRN treatment protocol with three intravitreal injections (IVIs) and a series of 3 monthly injections in case of persistent or recurrent disease activity, as determined by monthly follow-up exams including optical coherence tomographies. Occurrence of gaps of >56 days between treatments or follow-up (nonadherence [NA]) and the reasons for NA (patient- or center-associated) as well as disease activity within the first 12 months of treatment were analyzed. Visual acuity (VA) as well as numbers and dates of optical coherence tomography and IVI were extracted from medical records.

RESULTS: NA occurred significantly more often in patients with DME (44%) than nAMD (32%) or BRVO (25%, p<0.01 between groups). NA was mainly patient-associated (nAMD: 80.0%, DME: 83.1%, BRVO: 70.4%, p=0.38 between groups). Patients with nAMD and DME and appropriate treatment/follow-up adherence had a better chance of significantly gaining or maintaining VA, respectively (19.9% vs 12.0% with 3-line gain in nAMD and 1.3% vs 15.3% 3-line loss in DME; each p<0.05). NA did not correlate with VA outcomes in BRVO (3-line gain 30.9% vs 48.1% and 3-line loss 8.6% vs 7.4%; p>0.05).

CONCLUSION: NA to treatment and follow-up regimens is a common problem in the management of patients with AMD and DME and limits clinical treatment outcomes under real-life conditions. Patients with DME have the highest risk of patient-associated NA, associated with a higher risk for significant VA loss.

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The Real-World Effect of Intravitreous Anti-Vascular Endothelial Growth Factor Drugs on Intraocular Pressure: An Analysis Using the IRIS Registry.

Atchison EA, Wood KM, Mattox CG, Barry CN, Lum F, MacCumber MW.

PURPOSE: To identify sustained differences in intraocular pressure (IOP) after intravitreous injections of
anti-vascular endothelial growth factor (VEGF) drugs.

DESIGN: Database study.

PARTICIPANTS: Patients seeing an ophthalmic provider who contributes to the database.

METHODS: We identified a total of 23,776 unique patients who received only a single type of anti-VEGF medication (bevacizumab, aflibercept, or ranibizumab) by injection in the right eye in the American Academy of Ophthalmology Intelligent Research in Sight Registry. Subgroups included patients with age-related macular degeneration only and patients who had not received an anti-VEGF injection for at least 1 year before the study. We examined those with at least 12, 18, and 25 injections for each of these 3 medications. For all groups, we used fellow, untreated eyes for comparison.

MAIN OUTCOME MEASURES: The mean change in IOP from baseline at a minimum of 1 year of follow-up and the proportion of eyes with a clinically significant IOP increase (defined as sustained rise of at least 6 mmHg to an IOP of more than 21 mmHg).

RESULTS: All patients in all groups receiving all drugs showed a decrease in IOP from baseline, with a mean of 0.9 mmHg in treated eyes compared with an average decrease of 0.2 mmHg in fellow untreated eyes, a statistically significant difference. A generalized linear model accounting for confounders associated bevacizumab with slightly less lowering of IOP than aflibercept and ranibizumab in most subgroups. A clinically significant IOP increase was seen in 2.6% of eyes receiving injections compared with 1.5% in the associated untreated fellow eyes. Clinically significant IOP increases occurred at a rate of 1.9%, 2.8%, and 2.8% for aflibercept, ranibizumab, and bevacizumab, respectively, which was significantly higher than untreated fellow eyes for bevacizumab and ranibizumab, but not for aflibercept.

CONCLUSIONS: These analyses from real-world data indicate that anti-VEGF intravitreous injections are associated with a small but statistically significant decrease in IOP over time. A proportion of patients, on average 2.6%, experienced a sustained clinically significant IOP rise with these drugs overall compared with 1.5% in the fellow untreated eyes. However, such an increase was not seen with aflibercept.

PMID: 29336897


Intravitreal Aflibercept as Rescue Therapy for Post-Radiation Cystoid Macular Edema Resistant to Intravitreal Bevacizumab: Outcomes at 1 Year.

Khan MA, Mashayekhi A, Shields JA, Shields CL.

BACKGROUND/AIMS: To investigate the efficacy of intravitreal aflibercept as rescue therapy for post-radiation cystoid macular edema (CME) resistant to prior treatment with intravitreal bevacizumab (IVB).

METHODS: Retrospective, interventional, case-controlled series. Eyes with persistent post-radiation CME were treated with intravitreal aflibercept (2 mg/0.05 mL). Central macular thickness (CMT) and visual acuity were compared to a matched control group treated with only IVB at 1 year.

RESULTS: Ten eyes of 10 patients were included, with 5 eyes in the intervention and 5 in the control group. The eyes in the intervention group had previously been treated with IVB (mean 11.6 injections, range 6-22) but failed to show resolution of CME. Following rescue treatment with a mean of 9 injections of aflibercept, the mean CMT was reduced from 463 ± 138 to 267 ± 80 μm (p = 0.02) and the mean Snellen visual acuity was improved from 20/67 to 20/42 (p = 0.03). At 1 year, the eyes in the intervention group had lower CMT (267 ± 80 vs. 361 ± 71 μm, p = 0.09) and significantly better Snellen visual acuity (20/48 vs. 20/76, p = 0.02) compared to the control group.

CONCLUSIONS: Aflibercept may be an effective rescue therapy for persistent post-radiation CME in eyes with incomplete response to IVB, with reduction in CMT and improvement in visual acuity.

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Clinical observations on the use of new anti-VEGF drug, conbercept, in age-related macular degeneration therapy: a meta-analysis.

Cui C, Lu H.

PURPOSE: Conbercept is a new anti-vascular endothelial growth factor (VEGF) drug approved for the treatment of age-related macular degeneration (AMD). Although this novel drug has been widely used in clinic, unlike other anti-VEGF drugs, validation and consensus on its method of clinical application and clinical safety have not yet been achieved.

METHODS: Relevant literature was searched on PubMed, Web of Science, China National Knowledge Internet, and Wanfang Data. Stata 12.0 was used for data analysis. Random- and fixed-effect models were employed to evaluate heterogeneity. Best-corrected visual acuity (BCVA) and central retinal thickness (CRT) were utilized to measure the improvement of AMD patients.

RESULTS: In this study, we analyzed conbercept administration and compared its application with other control clinical methods for AMD treatment. Ranibizumab, triamcinolone, and traditional transpupillary thermotherapy (TTT) were administered in the control group. No differences were found in the BCVA and CRT improvement between the groups treated with conbercept and ranibizumab. However, the conbercept group had a lower serum VEGF level. After 3 months of treatment, conbercept led to a more significant BCVA and CRT improvement than triamcinolone. A more considerable BCVA improvement was observed in the group treated with conbercept than in the group treated with TTT. Moreover, even 6 months after the treatment, the effect of conbercept on CRT improvement was still more pronounced than that of TTT.

CONCLUSION: In AMD patients, conbercept exerts considerably more positive effects on the long-term BCVA and CRT improvement than triamcinolone and TTT. The serum VEGF level in the conbercept group was lower than that in the ranibizumab group.

PMID: 29343949 PMCID: PMC5747960


Efficacy of One-Year Treatment with Aflibercept for Diabetic Macular Edema with Practical Protocol.

Kaiho T, Oshitari T, Tatsumi T, Takatsu Y, Arai M, Shimizu N, Sato E, Baba T, Yamamoto S.

Abstract: The purpose of this study was to determine the efficacy of one-year treatment of diabetic macular edema (DME) with intravitreal aflibercept (IVA) injections on a practical protocol. The medical records of 51 eyes of 43 patients who were diagnosed with DME and had received IVA treatments were reviewed. The best-corrected visual acuity (BCVA) and the central macular thickness (CMT) were measured at the baseline and at 1, 3, 6, and 12 months after the IVA. The mean number of IVA injections was 3.8 ± 2.4. The mean BCVA was significantly better and the CMT was thinner after the IVA at all follow-up times (P < 0.05). The BCVA was better in eyes with a serous retinal detachment (SRD) than without a SRD (P < 0.01). There was a significant correlation between the photoreceptor outer segment (PROS) length and BCVA at the baseline and at 12 months after the IVA (P < 0.05). A fewer number of IVA injections significantly improved the BCVA and the CMT in eyes with DME after one-year treatment. IVA was more effective in the SRD+ group than in the SRD- group. The PROS length may be a predictive marker for visual outcomes after one-year treatment with IVA for DME (IRB#2272).

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Intraocular inflammatory cytokines in patients with neovascular age-related macular degeneration
before and after initiation of intravitreal injection of anti-VEGF inhibitor.

Sato T, Takeuchi M, Karasawa Y, Enoki T, Ito M.

Abstract: Age-related macular degeneration (AMD) is a cause of blindness in people older than 50 years. Accumulating evidence indicates the involvement of systemic and local inflammation in the pathogenesis and progression of AMD. Aflibercept is an anti-vascular endothelial growth factor (VEGF) inhibitor, and intravitreal injection of aflibercept (IVA) is the approved treatments of neovascular AMD (nAMD), but the effect on inflammatory response remains unclear. The aim of our study was to investigate the profiles of inflammatory cytokines in the aqueous humor of nAMD patients before and after initiation of IVA. In nAMD patients, IP-10 level was significantly higher and IL-6 level was significantly lower compared with those of cataract patients as controls. Logistic regression analysis identified IP-10 as a positive factor and IL-6 as a negative factor associated with the pathogenesis of nAMD. In addition, IP-10 level correlated positively with the mean thickness of macula in the central 1-mm diameter circle. After initiation of IVA, IP-10 level was further elevated, and correlated negatively with VEGF level. These data suggest that IP-10 plays a critical role as an antiangiogenic factor and at the same time an inflammatory factor in the pathogenesis and pathophysiology of nAMD eyes at onset and after IVA initiation.

PMID: 29348424

Other treatment & diagnosis

Ophthalmology. 2018 Jan 11. [Epub ahead of print]

Targeted Retinal Photocoagulation for Diabetic Macular Edema with Peripheral Retinal Nonperfusion: Three-Year Randomized DAVE Trial.


PURPOSE: To evaluate the effect of targeted retinal photocoagulation (TRP) on visual and anatomic outcomes and treatment burden in eyes with diabetic macular edema (DME).

DESIGN: Phase I/II prospective, randomized, controlled clinical trial.

PARTICIPANTS: Forty eyes of 29 patients with center-involved macular edema secondary to diabetes mellitus.

METHODS: Eyes with center-involved DME and Early Treatment Diabetic Retinopathy Study (ETDRS) best-corrected visual acuity (BCVA) between 20/32 and 20/320 (Snellen equivalent) were randomized 1:1 to monotherapy with 0.3 mg ranibizumab (Lucentis, Genentech, South San Francisco, CA) or combination therapy with 0.3 mg ranibizumab and TRP guided by widefield fluorescein angiography. All eyes received 4 monthly ranibizumab injections followed by monthly examinations and pro re nata (PRN) re-treatment through 36 months. Targeted retinal photocoagulation was administered outside the macula to areas of retinal capillary nonperfusion plus a 1-disc area margin in the combination therapy arm at week 1, with re-treatment at months 6, 18, and 25, if indicated.

MAIN OUTCOME MEASURES: Mean change in ETDRS BCVA from baseline and number of intravitreal injections administered.

RESULTS: At baseline, mean age was 55 years, mean BCVA was 20/63 (Snellen equivalent), and mean central retinal subfield thickness (CRT) was 530 μm. Thirty-four eyes (85%) completed month 36, at which point mean BCVA improved 13.9 and 8.2 letters (P = 0.20) and mean CRT improved 302 and 152 μm (P = 0.03) in the monotherapy and combination therapy arms, respectively. The mean number of injections administered through month 36 was 24.4 (range, 10-34) and 27.1 (range, 12-36), with 73% (362/496) and 80% (433/538) of PRN injections administered (P = 0.004) in the monotherapy and combination therapy arms, respectively. Goldmann visual field isopter III-4e area decreased by 2% and 18% in the monotherapy and combination therapy arms, respectively (P = 0.30).
CONCLUSIONS: In this 3-year randomized trial of 40 eyes with DME, there was no evidence that combination therapy with ranibizumab and TRP improved visual outcomes or reduced treatment burden compared with ranibizumab alone.

PMID: 29336896


Microspheres as intraocular therapeutic tools in chronic diseases of the optic nerve and retina.


Abstract: Pathologies affecting the optic nerve and the retina are one of the major causes of blindness. These diseases include age-related macular degeneration (AMD), diabetic Retinopathy (DR) and glaucoma, among others. Also, there are genetic disorders that affect the retina causing visual impairment. The prevalence of neurodegenerative diseases of the posterior segment are increased as most of them are related with the elderly. Even with the access to different treatments, there are some challenges in managing patients suffering retinal diseases. One of them is the need for frequent interventions. Also, an unpredictable response to therapy has suggested that different pathways may be playing a role in the development of these diseases. The management of these pathologies requires the development of controlled drug delivery systems able to slow the progression of the disease without the need of frequent invasive interventions, typically related with endophthalmitis, retinal detachment, ocular hypertension, cataract, inflammation, and floaters, among other. Biodegradable microspheres are able to encapsulate low molecular weight substances and large molecules such as biotechnological products. Over the last years, a large variety of active substances has been encapsulated in microspheres with the intention of providing neuroprotection of the optic nerve and the retina. The purpose of the present review is to describe the use of microspheres in chronic neurodegenerative diseases affecting the retina and the optic nerve. The advantage of microencapsulation of low molecular weight drugs as well as therapeutic peptides and proteins to be used as neuroprotective strategy is discussed. Also, a new use of the microspheres in the development of animal models of neurodegeneration of the posterior segment is described.

PMID: 29339146


Use of a Neural Net to Model the Impact of Optical Coherence Tomography Abnormalities on Vision in Age-related Macular Degeneration.

Aslam TM, Mahmood S, Ali ZC, Ahmad NA, Thorell MR, Balaskas K.

PMID: 29338850

Pathogenesis


PEDF Expression Affects the Oxidative and Inflammatory State of Choroidal Endothelial Cells.

Farnoodian M, Sorenson CM, Sheibani N.

Abstract: Age related macular degeneration (AMD) is the leading cause of vision loss among the elderly population, and is associated with severe macular degeneration and choroidal neovascularization (CNV). Although the pathogenesis of AMD is associated with choroidal dysfunction and CNV, the detailed
underlying mechanisms remain unresolved. Altered production of pigment epithelium derived factor (PEDF), a neuroprotective and anti-angiogenic factor, contributes to CNV. Furthermore, exogenous PEDF mitigates angiogenesis in preclinical CNV models. How PEDF expression affects choroidal endothelial cell (ChEC) function is unknown. Here we isolated ChEC from PEDF+/+ and PEDF-deficient (PEDF-/-) mice and determined the impact of PEDF expression on the proangiogenic and proinflammatory properties of ChEC. We showed that PEDF expression significantly affects the proliferation, migration, adhesion, and oxidative and inflammatory state of ChEC. The PEDF-/- ChEC were, however, more sensitive to H2O2 challenge and exhibited increased rate of apoptosis and oxidative stress. We also observed a significant increase in production of cytokines with a primary role in inflammation and angiogenesis including VEGF and osteopontin, and a reprogramming of chemokines and cytokines expression profiles in PEDF-/- ChEC. Collectively, our results indicate that PEDF expression has a significant impact on oxidative and inflammatory properties of ChEC, whose alteration could contribute to pathogenesis of chronic inflammatory diseases including exudative AMD.

PMID: 29351407

J Cell Physiol. 2018 Jan 16. [Epub ahead of print]

Effect of sex steroid hormone fluctuations in the pathophysiology of male- retinal pigment epithelial cells.

Astarita C, D'Angelo-Maansson B, Massaro-Giordano M, Alba MP, Boffo S, Macchi I, Giordano A, Macaluso M.

Abstract: Gender-based differences may influence the occurrence of several ocular conditions suggesting the possibility that fluctuations in sex steroid homeostasis may have direct effects on the eye physiology. Here, we evaluated the effect of sex steroid hormone fluctuations in male retinal pigment epithelial cells, RPEs (ARPE-19). To mimic hormonal fluctuations occurring during aging, we exposed ARPE-19 to acute, prolonged or chronic estradiol and progesterone challenges. We found that chronic estradiol treatment promotes a remarkable necrosis of RPE cells, and does not affect pRb2/p130 or PAI-2 subcellular localization. In contrast, chronic progesterone exposure induces nuclear subcellular rearrangement of pRb2/p130, co-immunolocalization of pRb2/p130 with PAI-2, and accumulation of cells in G2/M phase, which is accompanied by a remarkable reduction of necrosis in favour of apoptosis activation. This study has a high clinical significance since it considers sex steroid fluctuations as inducers of milieu change in the retina able to influence pathological situations occurring with aging in non-reproductive systems such as the eye. Exogenous administration of physiologically significant amounts of sex hormones for long periods of time is a common clinical practice for transgender patients seeking sex reassignment. In particular, our study offers the unique opportunity to unravel the effects of sex hormones, not only in determining gender differences but also in affecting the physiology of non-reproductive systems, such as the eye, in the underserved transgender community. This article is protected by copyright. All rights reserved.

PMID: 29336491


Zinc Protects Oxidative Stress-Induced RPE Death by Reducing Mitochondrial Damage and Preventing Lysosome Rupture.

Rajapakse D, Curtis T, Chen M, Xu H.

Abstract: Zinc deficiency is known to increase the risk of the development of age-related macular degeneration (AMD), although the underlying mechanism remains poorly defined. In this study, we investigated the effect of zinc on retinal pigment epithelium (RPE) survival and function under oxidative conditions. Zinc level was 5.4 μM in normal culture conditions (DMEM/F12 with 10% FCS) and 1.5 μM in serum-free medium (DMEM/F12). Under serum-free culture conditions, the treatment of RPE cells with
oxidized photoreceptor outer segment (oxPOS) significantly increased intracellular ROS production, reduced ATP production, and promoted RPE death compared to oxPOS-treated RPE under normal culture condition. Serum deprivation also reduced RPE phagocytosis of oxPOS and exacerbated oxidative insult-induced cathepsin B release from lysosome, an indicator of lysosome rupture. The addition of zinc in the serum-free culture system dose dependently reduced ROS production, recovered ATP production, and reduced oxidative stress- (oxPOS- or 4-HNE) induced cell death. Zinc supplementation also reduced oxidative stress-mediated cathepsin B release in RPE cells. Our results suggest that zinc deficiency sensitizes RPE cells to oxidative damage, and zinc supplementation protects RPE cells from oxidative stress-induced death by improving mitochondrial function and preventing lysosome rupture.

PMID: 29348791 PMCID: PMC5733978

**Epidemiology**


Gender-specific association of early age-related macular degeneration with systemic and genetic factors in a Japanese population.


Abstract: The Tsuruoka Metabolomics Cohort Study included subjects aged 35-74 years from participants in annual health check-up programs in Tsuruoka, Japan. The gender-specific associations of early age-related macular degeneration (AMD) with systemic and genetic factors was assessed cross-sectionally. Of these, 3,988 subjects had fundus photographs of sufficient quality, and early AMD was present in 12.3% and 10.3% of men and women, respectively. In men, higher levels of high-density lipoprotein cholesterol and lower levels of triglycerides were associated with increased odds of having early AMD after adjusting for potential risk factors (for each 1 mmol/L increase, odds ratio [OR]: 1.61 and 0.78, 95% confidence interval [CI]: 1.17-2.23 and 0.64-0.96, respectively). In women, higher levels of total cholesterol and low-density lipoprotein cholesterol were associated with increased risk of having early AMD (OR: 1.21 and 1.26, 95% CI: 1.01-1.44 and 1.03-1.53, respectively). Sub-analysis demonstrated that women with ARMS2 A69S polymorphisms had a stronger risk for early AMD (OR: 3.25, 95% CI: 2.10-5.04) than men (OR: 1.65, 95% CI: 1.02-2.69). Differential associations of early AMD with both systemic and genetic factors by sex were demonstrated in a Japanese cohort, which suggests that disease process of early AMD could be different by sex.

PMID: 29335418

**Genetics & gene therapy**

Hum Mol Genet. 2018 Jan 15. [Epub ahead of print]

Genome-wide Analysis of Disease Progression in Age-related Macular Degeneration.


Abstract: Family- and population-based genetic studies have successfully identified multiple disease-susceptibility loci for Age-related Macular Degeneration (AMD), one of the first batch and most successful examples of genome-wide association study (GWAS). However, most genetic studies to date have focused on case-control studies of late AMD (choroidal neovascularization [CNV] or geographic atrophy [GA]). The genetic influences on disease progression are largely unexplored. We assembled unique resources to perform a genome-wide bivariate time-to-event analysis to test for association of time-to-late-AMD with ~9 million variants on 2,721 Caucasians from a large multi-center randomized clinical trial, the Age-Related
Eye Disease Study. To our knowledge, this is the first GWAS study of disease progression (bivariate survival outcome) in AMD genetic studies, thus providing novel insights to AMD genetics. We used a robust Cox proportional hazards model to appropriately account for between-eye correlation when analyzing the progression time in the two eyes of each participant. We identified four previously-reported susceptibility loci showing genome-wide significant association with AMD progression: ARMS2-HTRA1 (P=8.1 × 10^-43), CFH (P=3.5 × 10^-37), C2-CFB-SKIV2L (P=8.1 × 10^-10), and C3 (P=1.2 × 10^-9). Furthermore, we detected association of rs58978565 near TNR (P=2.3 × 10^-8), rs28368872 near ATF7IP2 (P=2.9 × 10^-8) and rs142450006 near MMP9 (P=0.0006) with progression to CNV but not GA. Secondary analysis limited to 34 reported risk variants revealed that LIPC and CTRB2-CTRB1 were also associated with AMD progression (P<0.0015). Our genome-wide analysis thus expands the genetics in both development and progression of AMD and should assist in early identification of high risk individuals.

PMID: 29346644

**Stem cells**


The Suprachoroidal Delivery Route and Exploring the Potential of Cell-Based Therapies for Age-Related Macular Degeneration.

Olsen TW.

PMID: 29346489

**Diet, lifestyle & low vision**


Association of Low Luminance Questionnaire With Objective Functional Measures in Early and Intermediate Age-Related Macular Degeneration.

Thompson AC, Luhmann UFO, Stinnett SS, Vajzovic L, Horne A, Toth CA, Cousins SW, Lad EM.

PURPOSE: To determine whether Low Luminance Questionnaire (LLQ) scores are associated with objective measures of visual function in early and intermediate age-related macular degeneration (AMD).

METHODS: Cross-sectional study of subjects with early AMD Age-Related Eye Disease Study (AREDS) stage 2, N = 33), intermediate AMD (AREDS stage 3, N = 47), and age-matched healthy controls (N = 21). Subjects were interviewed with the LLQ. Psychophysical tests performed included best-corrected visual acuity (BCVA), mesopic microperimetry, dark adaptometry (DA), low luminance visual acuity (LLVA), and cone contrast test (CCT). Low luminance deficit (LLD) was the difference in the number of letters read under photopic versus low luminance settings. The relationship between LLQ and visual function test scores was assessed with linear regression.

RESULTS: Subjects with intermediate AMD had significantly lower LLQ composite scores (mean = 75.8 ± 16.7; median = 76, range [29, 97]) compared with early AMD (mean = 85.3 ± 13.3; median = 88, range [50, 100], P = 0.007) or controls (mean = 91.4 ± 6.5; median = 94, range [79, 99], P < 0.001) in the overall cohort. LLQ composite scores were associated with computerized BCVA (β = 0.516), computerized LLVA at two background luminance (1.3 cd/m2, β = 0.660; 0.5 cd/m2, β = 0.489) along with their respective computerized LLDs (β = -0.531 and -0.467), rod intercept (β = -0.312), and CCT green (β = 0.183) (all P < 0.05). Only the computerized LLVAs and computerized LLDs remained statistically significant after adjusting for AMD versus control status (P < 0.05). Among AMD subjects, LLQ composite scores were significantly associated with the computerized LLVAs (β = 0.622 and 0.441) and LLDs (β = -0.795 and -0.477) at both the 1.3 and 0.5 cd/m2 luminance levels, respectively, and these associations remained
significant after adjusting for AMD severity (P < 0.05).

CONCLUSIONS: Among subjects with early and intermediate AMD, LLQ scores were significantly associated with computerized LLVA and LLD. LLQ is a useful patient-centered functional measure of visual impairment in early and intermediate AMD.

PMID: 29340643 PMCID: PMC5770180


Effects of Age-Related Macular Degeneration on Driving Performance.

Wood JM, Black AA, Mallon K, Kwan AS, Owsley C.

PURPOSE: To explore differences in driving performance of older adults with age-related macular degeneration (AMD) and age-matched controls, and to identify the visual determinants of driving performance in this population.

METHODS: Participants included 33 older drivers with AMD (mean age [M] = 76.6 ± 6.1 years; better eye Age-Related Eye Disease Study grades: early [61%] and intermediate [39%]) and 50 age-matched controls (M = 74.6 ± 5.0 years). Visual tests included visual acuity, contrast sensitivity, visual fields, and motion sensitivity. On-road driving performance was assessed in a dual-brake vehicle by an occupational therapist (masked to drivers' visual status). Outcome measures included driving safety ratings (scale of 1-10, where higher values represented safer driving), types of driving behavior errors, locations at which errors were made, and number of critical errors (CE) requiring an instructor intervention.

RESULTS: Drivers with AMD were rated as less safe than controls (4.8 vs. 6.2; P = 0.012); safety ratings were associated with AMD severity (early: 5.5 versus intermediate: 3.7), even after adjusting for age. Drivers with AMD had higher CE rates than controls (1.42 vs. 0.36, respectively; rate ratio 3.05, 95% confidence interval 1.47-6.36, P = 0.003) and exhibited more observation, lane keeping, and gap selection errors and made more errors at traffic light-controlled intersections (P < 0.05). Only motion sensitivity was significantly associated with driving safety in the AMD drivers (P = 0.005).

CONCLUSIONS: Drivers with early and intermediate AMD can exhibit impairments in their driving performance, particularly during complex driving situations; motion sensitivity was most strongly associated with driving performance. These findings have important implications for assessing the driving ability of older drivers with visual impairment.

PMID: 29340641 PMCID: PMC5770181


Repeatability and Agreement of Visual Acuity Using the ETDRS Number Chart, Landolt C Chart, or ETDRS Alphabet Chart in Eyes With or Without Sight-Threatening Diseases.

Chaikitmongkol V, Nanegrungsunk O, Patikulsila D, Ruamviboonsuk P, Bressler NM.

IMPORTANCE: The Early Treatment Diabetic Retinopathy Study (ETDRS) alphabet chart is not feasible for measuring best-corrected visual acuity (BCVA) for individuals who are unfamiliar with the Roman alphabet. The ETDRS Landolt C chart is an alternative, but it may not reflect true BCVA among those with confusion between left and right. The ETDRS number chart might overcome these limitations, but little is known regarding its reliability.

OBJECTIVE: To evaluate repeatability and agreement of BCVA using the ETDRS number chart or Landolt C chart compared with ETDRS alphabet charts in healthy and diseased eyes.

DESIGN, SETTING, AND PARTICIPANTS: A cross-sectional study was conducted in Thailand from July 1,
2015, to June 30, 2016, among 154 adult Thai individuals. Those who could read Roman alphabets were classified into the following 4 groups, using 1 eye per participant: group A, which comprised 60 healthy eyes (BCVA, 20/20-20/25); group B, which comprised 40 eyes with age-related cataract, diabetic macular edema, or age-related macular degeneration (BCVA, 20/20-20/40); group C, which comprised 40 eyes with age-related cataract, diabetic macular edema, or age-related macular degeneration (BCVA, 20/50-20/100); and group D, which comprised 14 eyes with age-related cataract, diabetic macular edema, or age-related macular degeneration (BCVA, 20/125-20/200).

INTERVENTIONS: Two standardized 4-m BCVA measurements with 3 different Precision Vision ETDRS charts (PV number, Landolt C, and alphabet), in random sequence, performed 30 minutes apart.

MAIN OUTCOMES AND MEASURES: Repeatability, agreement, and testing duration of BCVA.

RESULTS: Of 154 Thai participants (82 women and 72 men; mean [SD] age, 52.9 [18.2] years), the ETDRS number chart had strong repeatability coefficients (group A, 0.61 [95% CI, 0.42-0.75]; group B, 0.87 [95% CI, 0.78-0.93]; group C, 0.81 [95% CI, 0.67-0.90]; and group D, 0.81 [95% CI, 0.49-0.94]). Concordance correlation coefficients between the number and alphabet charts were also strong (group A, 0.89 [95% CI, 0.82-0.93]; group B, 0.97 [95% CI, 0.94-0.98]; group C, 0.92 [95% CI, 0.86-0.96]; and group D, 0.96 [95% CI, 0.87-0.99]), while the concordance correlation coefficients between the Landolt C and alphabet charts were lower (group A, 0.72 [95% CI, 0.52-0.83]; group B, 0.83 [95% CI, 0.68-0.91]; group C, 0.79 [95% CI, 0.61-0.89]; and group D, 0.89 [95% CI, 0.66-0.97]). The mean letter score difference between the number and alphabet charts was 1 (95% limits of agreement, -4 to +6) compared with -7 (95% limits of agreement, -18 to +5; P < .001) between the Landolt C and alphabet charts.

CONCLUSIONS AND RELEVANCE: The repeatability coefficients and concordance correlation coefficients suggest that ETDRS number charts are viable for measuring BCVA in clinical practice and trials for individuals who are unfamiliar with the Roman alphabet.

PMID: 29346499


Searching for unity: Real-world versus item-based visual search in age-related eye disease.

Crabb DP, Taylor DJ.

Abstract: When studying visual search, item-based approaches using synthetic targets and distractors limit the real-world applicability of results. Everyday visual search can be impaired in patients with common eye diseases like glaucoma and age-related macular degeneration. We highlight some results in the literature that suggest assessment of real-word search tasks in these patients could be clinically useful.

PMID: 29342614

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