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MD Research News

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This free weekly bulletin lists the latest published research articles on macular degeneration (MD) as indexed in the NCBI, PubMed (Medline) and Entrez (GenBank) databases. These articles were identified by a search using the key term “macular degeneration”.

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Drug treatment

Ophthalmology. 2013 May 22. pii: S0161-6420(13)00314-X. doi: 10.1016/j.ophtha.2013.03.029. [Epub ahead of print]

Incidence and Progression of Geographic Atrophy: Observations from a Population-based Cohort.

Joachim N, Mitchell P, Kifley A, Rochtchina E, Hong T, Wang JJ.

Center for Vision Research, Department of Ophthalmology and Westmead Millennium Institute, University of Sydney, Sydney, Australia.

PURPOSE: To examine early age-related macular degeneration (AMD) lesion characteristics and risk factors associated with the long-term development and progression of geographic atrophy (GA).

DESIGN: Population-based cohort.

PARTICIPANTS: Of 3654 participants aged ≥49 years in the Blue Mountains Eye Study, 75.8%, 76.7%, and 56.1% of survivors attended the 5-, 10-, and 15-year follow-up examinations, respectively.

METHODS: Retinal photographs were taken at each visit. Incident GA was confirmed using a side-by-side grading method. Computer planimetry was used to measure the area involved by GA. Fast and slow/normal progression rates were defined as GA area enlargement by ≥2 and <2 mm2/year, respectively. Incident GA was estimated using the Kaplan-Meier product-limit method. Early AMD lesion characteristics were assessed for association with GA incidence using eye-specific data and generalized estimating equation models adjusting for age, current smoking, and presence of risk alleles of the complement factor H (CFH) or age-related maculopathy susceptibility 2 (ARMS2) genes, genotyped or imputed using genome-wide scan data.

MAIN OUTCOME MEASURES: Incidence and progression of GA.

RESULTS: By excluding 41 subjects with GA at baseline, of 2503 participants at risk of GA, incident pure GA (without coexisting neovascular AMD lesions) was confirmed in 57 participants, with a 15-year incidence of 3.6%. Baseline early AMD lesion characteristics associated with GA incidence included drusen type (soft indistinct: odds ratio [OR], 59.0; 95% confidence interval [CI], 20.4-171.0; reticular drusen: OR, 13.9; 95% CI, 4.0-47.6); drusen location within a 500-μm radius of the fovea (OR, 15.1; 95% CI, 7.4-30.8); drusen area greater than 375 μm in diameter (OR, 10.1; 95% CI, 4.0-25.6); presence of retinal pigment epithelial depigmentation (OR, 9.0; 95% CI, 4.1-19.8); or hyperpigmentation (OR, 12.0; 95% CI, 6.1-23.5), referenced to subjects with no or hard drusen only. Fast progression was more frequent among current smokers at baseline, subjects with the CFH or ARMS2 risk genotypes, and pseudophakic eyes.

CONCLUSIONS: Early AMD lesion characteristics (type, location, area involved) were strongly associated with higher long-term risk of developing GA independent of age, smoking, and AMD genetic susceptibility from the CFH or ARMS2 genes. Known AMD risk factors also were more frequently present among quickly progressing GA cases.

PMID: 23706948 [PubMed - as supplied by publisher]

Ophthalmology. 2013 May 22. pii: S0161-6420(13)00241-8. doi: 10.1016/j.ophtha.2013.03.017. [Epub ahead of print]

Incidence of Choroidal Neovascularization in the Fellow Eye in the Comparison of Age-Related Macular Degeneration Treatments Trials.

Maguire MG, Daniel E, Shah AR, Grunwald JE, Hagstrom SA, Avery RL, Huang J, Martin RW, Roth DB, Castellarin AA, Bakri SJ, Fine SL, Martin DF; Comparison of Age-Related Macular Degeneration Treatments Trials (CATT Research Group).

Department of Ophthalmology, University of Pennsylvania, Philadelphia, Pennsylvania.

OBJECTIVE: To assess the influence of drug; dosing regimen; and traditional, nontraditional, and genetic risk factors on the incidence of choroidal neovascularization (CNV) in the fellow eye of patients treated for CNV with ranibizumab or bevacizumab.

DESIGN: Cohort study of patients enrolled in a multicenter, randomized clinical trial.

PARTICIPANTS: Patients with no CNV in the fellow eye at the time of enrollment in the Comparison of Age -Related Macular Degeneration Treatments Trials (CATT).

METHODS: Eligibility criteria for the clinical trial required that study eyes have evidence on fluorescein angiography and optical coherence tomography of CNV secondary to age-related macular degeneration (AMD) and visual acuity between 20/25 and 20/320. Treatment for the study eye was assigned randomly to either ranibizumab or bevacizumab and to 3 different regimens for dosing over a 2-year period. The genotypes for 4 single nucleotide polymorphisms (SNPs) associated with risk of AMD were determined. Only patients without CNV in the fellow eye at baseline were considered at risk. The CATT ophthalmologists examined patients every 4 weeks through 2 years and recorded treatment for CNV in the fellow eye.

MAIN OUTCOME MEASURES: Development of CNV in the fellow eye.

RESULTS: Among 1185 CATT participants, 727 (61%) had no CNV in the fellow eye at enrollment. At 2 years, CNV had developed in 75 (20.6%) of 365 patients treated with ranibizumab and in 60 (16.6%) of 362 patients treated with bevacizumab (absolute difference, 4.0%; 95% confidence interval [CI], -1.7% to 9.6%; P = 0.17). The risk ratio for pro re nata dosing relative to monthly dosing was 1.1 (95% CI, 0.8-1.6). Greater elevation of the retinal pigment epithelium and fluid in the foveal center of the study eye were associated with increased incidence of CNV in the fellow eye. Incidence was not associated with genotype on rs1061170 (CFH), rs10490924 (ARMS2), rs11200638 (HTRA1), and rs2230199 (C3; P>0.35).

CONCLUSIONS: Through 2 years, there was no statistically significant difference between ranibizumab and bevacizumab in incidence of CNV in the fellow eye. Genotype on 4 SNPs previously found to be associated with AMD did not affect the risk of CNV in the fellow eye among CATT patients.

PMID: 23706946 [PubMed - as supplied by publisher]

Am J Ophthalmol. 2013 May 22. pii: S0002-9394(13)00144-X. doi: 10.1016/j.ajo.2013.02.017. [Epub ahead of print]

Aflibercept Therapy for Exudative Age-related Macular Degeneration Resistant to Bevacizumab and Ranibizumab.

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Department of Ophthalmology and Visual Sciences, The University of Iowa Hospitals & Clinics, Iowa City, Iowa, Iowa City, Iowa.

PURPOSE: To evaluate the outcome of intravitreal injection of aflibercept in cases with exudative age-related macular degeneration, (AMD) resistant to injections of bevacizumab or ranibizumab.

DESIGN: Retrospective observational case series.

METHODS: A retrospective chart review at a single institution was conducted to identify patients with exudative AMD and choroidal neovascularization (CNV) in 1 or both eyes resistant to treatment with ranibizumab or bevacizumab who were switched to treatment with at least 3 monthly injections of aflibercept. In total, 36 eyes from 31 patients were included. The demographic data, visual acuities, central macular thickness on optical coherence tomography (OCT), complications, and number of injections were reviewed.

RESULTS: The mean patient age was 79 years (range 60-88). There were 13 male and 18 female patients. The number of prior injections with either bevacizumab or ranibizumab ranged from 6-74. After 3 monthly injections of aflibercept, there was a reduction of either subretinal or intraretinal fluid in 18 of 36 (50.0%) of the treated eyes; the amount of fluid remained stable in 15 eyes (41.7%) and worsened in 3 eyes (8.3%). A significant average decrease was observed for the central macular thickness after 3 injections of 65 μm ($P = 2.9 \times 10\text{-}6$), with no significant change in visual acuity.

CONCLUSIONS: Aflibercept therapy appears to be beneficial in a subset of patients with neovascular age-related macular degeneration who exhibit recurrent or resistant intraretinal or subretinal fluid following multiple injections with either bevacizumab or ranibizumab.

PMID: 23706500 [PubMed - as supplied by publisher]

Ophthalmology. 2013 May 22. pii: S0161-6420(13)00212-1. doi: 10.1016/j.ophtha.2013.02.034. [Epub ahead of print]

Long-term Outcomes of Ranibizumab Therapy for Diabetic Macular Edema: The 36-Month Results from Two Phase III Trials: RISE and RIDE.

Brown DM, Nguyen QD, Marcus DM, Boyer DS, Patel S, Feiner L, Schlottmann PG, Rundle AC, Zhang J, Rubio RG, Adamis AP, Ehrlich JS, Hopkins JJ; RIDE and RISE Research Group.

Retina Consultants of Houston, The Methodist Hospital, Houston, Texas.

PURPOSE: To report 36-month outcomes of RIDE (NCT00473382) and RISE (NCT00473330), trials of ranibizumab in diabetic macular edema (DME).

DESIGN: Phase III, randomized, multicenter, double-masked, 3-year trials, sham injection-controlled for 2 years.

PARTICIPANTS: Adults with DME (n=759), baseline best-corrected visual acuity (BCVA) 20/40 to 20/320 Snellen equivalent, and central foveal thickness (CFT) ≥275 μm on optical coherence tomography.

METHODS: Patients were randomized equally (1 eye per patient) to monthly 0.5 mg or 0.3 mg ranibizumab or sham injection. In the third year, sham patients, while still masked, were eligible to cross over to monthly 0.5 mg ranibizumab. Macular laser was available to all patients starting at month 3; panretinal laser was available as necessary.

MAIN OUTCOME MEASURES: The proportion of patients gaining ≥15 Early Treatment Diabetic Retinopathy Study letters in BCVA from baseline at month 24.

RESULTS: Visual acuity (VA) outcomes seen at month 24 in ranibizumab groups were consistent through month 36; the proportions of patients who gained ≥15 letters from baseline at month 36 in the sham/0.5 mg, 0.3 mg, and 0.5 mg ranibizumab groups were 19.2%, 36.8%, and 40.2%, respectively, in RIDE and 22.0%, 51.2%, and 41.6%, respectively, in RISE. In the ranibizumab arms, reductions in CFT seen at 24 months were, on average, sustained through month 36. After crossover to 1 year of treatment with ranibizumab, average VA gains in the sham/0.5 mg group were lower compared with gains seen in the ranibizumab patients after 1 year of treatment (2.8 vs. 10.6 and 11.1 letters). Per-injection rates of endophthalmitis remained low over time (~0.06% per injection). The incidence of serious adverse events potentially related to systemic vascular endothelial growth factor inhibition was 19.7% in patients who received 0.5 mg ranibizumab compared with 16.8% in the 0.3 mg group.

CONCLUSIONS: The strong VA gains and improvement in retinal anatomy achieved with ranibizumab at month 24 were sustained through month 36. Delayed treatment in patients receiving sham treatment did not seem to result in the same extent of VA improvement observed in patients originally randomized to ranibizumab. Ocular and systemic safety was generally consistent with the results seen at month 24.

PMID: 23706949 [PubMed - as supplied by publisher]

Eye (Lond). 2013 May 31. doi: 10.1038/eye.2013.107. [Epub ahead of print]

Adverse events and complications associated with intravitreal injection of anti-VEGF agents: a review of literature.

Ghasemi Falavarjani K, Nguyen QD.

Department of Ophthalmology, Eye Research Center, Rassoul Akram Hospital, Tehran University of Medical Sciences, Tehran, Iran.

Abstract: Intravitreal injection of anti-vascular endothelial growth factor (VEGF) agents is increasingly used for the treatment of a wide variety of retinal diseases, including age-related macular degeneration, diabetic retinopathy and retinal vascular occlusions, and retinopathy of prematurity. Despite encouraging results in halting the disease and improving the vision, intravitreal injection of anti-VEGF agents may be associated with systemic adverse events and devastating ocular complications. In this review, we provide an overview of safety data for intravitreal injection of common anti-VEGF agents.Eye advance online publication, 31 May 2013; doi:10.1038/eye.2013.107.

PMID: 23722722 [PubMed - as supplied by publisher]

Ophthalmology. 2013 May 25. pii: S0161-6420(13)00240-6. doi: 10.1016/j.ophtha.2013.03.016. [Epub ahead of print]

Combination Therapy for Neovascular Age-Related Macular Degeneration Refractory to Anti-Vascular Endothelial Growth Factor Agents.

Tozer K, Roller AB, Chong LP, Sadda S, Folk JC, Mahajan VB, Russell SR, Boldt HC, Sohn EH.

Doheny Eye Institute and the Department of Ophthalmology, Keck School of Medicine, University of Southern California, Los Angeles, California; VMR Institute, Huntington Beach, California.

OBJECTIVE: To examine the outcomes of combination anti-vascular endothelial growth factor (VEGF) and photodynamic therapy (PDT) for the treatment of neovascular age-related macular degeneration (AMD) refractory to anti-VEGF monotherapy.

DESIGN: Retrospective, interventional case series.

PARTICIPANTS: Twenty-six eyes of 26 patients treated with anti-VEGF monotherapy for neovascular AMD with persistent subretinal or intraretinal fluid after at least 3 anti-VEGF injections in the 7 months before combination treatment.

INTERVENTION: Combination anti-VEGF treatment and PDT.

MAIN OUTCOME MEASURES: Visual acuity at 1 or 2, 3, and 6 months and central retinal thickness at 1 or 2, 3, and 6 months. Secondary outcome measures were change in number of fluid-free visits and interval between treatments in the 7 months before and 6 months after combination therapy.

RESULTS: Statistically significant improvements in logarithm of the minimum angle of resolution visual acuities were present at 1 month (P = 0.01) and 3 months (P = 0.01). Significant decreases in central subfield retinal thickness on optic coherence tomography (OCT) were seen at 1 month (P = 4×10-5), 3 months (P = 3×10-4), and 6 months (P = 4×10-5) as compared with precombination treatment OCT scans. The percentage of patient visits with no subretinal fluid increased from 0.5% to 41% after the initiation of combination therapy (P = 1×10-5). The interval between treatments increased from once every 1.6 months in the 7 months before combination treatment to once every 2.7 months in the 6 months after combination treatment (P = 0.002). No ocular complications attributable to PDT were seen.

CONCLUSIONS: Rescue therapy with the combination of anti-VEGF and PDT in eyes that have failed anti-VEGF monotherapy resulted in a mean improvement in vision, a decreased central subfield retinal thickness, and an increase in fluid-free intervals.

PMID: 23714319 [PubMed - as supplied by publisher]

Other treatment & diagnosis

J Ophthalmol. 2013;2013:465169. doi: 10.1155/2013/465169. Epub 2013 Apr 22.

Choice of Cell Source in Cell-Based Therapies for Retinal Damage due to Age-Related Macular Degeneration: A Review.

John S, Natarajan S, Parikumar P, Shanmugam P M, Senthilkumar R, Green DW, Abraham SJ.

The Mary-Yoshio Translational Hexagon (MYTH), Nichi-In Centre for Regenerative Medicine (NCRM), P.O. Box 1262, Nungambakkam, Chennai 600034, India.

Background: Age-related macular degeneration (AMD) is a complex disorder that affects primarily the macula involving the retinal pigment epithelium (RPE) but also to a certain extent the photoreceptor layer and the retinal neurons. Cell transplantation is a promising option for AMD and clinical trials are underway using different cell types.

Methods: We hypothesize that instead of focusing on a particular cell source for concurrent regeneration of all the retinal layers and also to prevent exhaustive research on an array of cell sources for regeneration of each layer, the choice should depend on, precisely, which layer is damaged.

Results: Thus, for a damage limited to the retinal pigment epithelial (RPE) layer, the choice we suggest would be RPE cells. When the damage extends to rods and cones, the choice would be bone marrow stem cells and when retinal neurons are involved, relatively immature stem cell populations with an inherent capacity to yield neuronal lineage such as hematopoietic stem cells, embryonic stem cells, or induced pluripotent stem cells can be tried.

Conclusion: This short review will prove to be a valuable guideline for those working on cell therapy for AMD to plan their future directions of research and therapy for this condition.

PMID: 23710332 [PubMed] PMCID: PMC3654320

J Cataract Refract Surg. 2013 May 24. pii: S0886-3350(13)00559-2. doi: 10.1016/j.jcrs.2013.05.014. [Epub ahead of print]

Transscleral suturing of the implantable miniature telescope.

Farid M.

From the Gavin Herbert Eye Institute, University of California, Irvine, California, USA. Electronic address: mfarid@uci.edu.

A technique is described for transscleral suturing of the implantable miniature telescope device for end-stage age-related macular degeneration. It provides stabilization and centration of the implantable miniature telescope device in the case of capsule rupture or severe zonular dialysis. FINANCIAL DISCLOSURE: The author has no financial or proprietary interest in any material or method mentioned.

PMID: 23707409 [PubMed - as supplied by publisher]

Ophthalmology. 2013 May 21. pii: S0161-6420(13)00313-8. doi: 10.1016/j.ophtha.2013.03.028. [Epub ahead of print]

Refractive Errors and Age-Related Macular Degeneration: A Systematic Review and Meta-Analysis.

Pan CW, Ikram MK, Cheung CY, Choi HW, Cheung CM, Jonas JB, Saw SM, Wong TY.

Saw Swee Hock School of Public Health, National University of Singapore, Singapore.

OBJECTIVE: To evaluate the association between refractive errors and age-related macular degeneration (AMD).

MAIN OUTCOME MEASURES: A clear understanding of the relationship between refractive error and AMD provides insights into the pathophysiology of AMD.

METHODS: We searched PubMed and Embase from their inception to July 2012 for population-based studies with data on refractive error and AMD assessed from retinal photographs at baseline and follow-up. We performed separate meta-analyses for cross-sectional studies and cohort studies using adjusted odds ratios (ORs) and hazard ratios (HRs) under random effects models, respectively.

RESULTS: Analysis of the 6 cross-sectional studies showed that hyperopia was associated with higher odds of prevalent AMD (pooled OR hyperopia vs. emmetropia: 1.16; 95% confidence interval [CI], 1.04-1.29) and that myopia was associated with lower odds of prevalent AMD (pooled OR myopia vs. emmetropia: 0.75; 95% CI, 0.61-0.92). Analysis from the 3 cohort studies showed nonsignificant associations. Analysis of the 5 cross-sectional and 2 cohort studies showed that each diopter increase in spherical equivalent was associated with increased odds of both prevalent (pooled OR, 1.09; 95% CI, 1.06-1.12) and incident (pooled HR, 1.06; 95% CI, 1.02-1.10) AMD. In 3 cross-sectional studies with data on axial length, each millimeter increase in axial length was associated with a decreased odd of prevalent AMD (pooled OR, 0.76; 95% CI, 0.69-0.85).

CONCLUSIONS: Refractive error is associated with AMD, although a temporal relationship cannot be determined on the basis of current evidence. Ophthalmologists should be aware that risk of AMD clinically seems to vary by refractive status.

PMID: 23706699 [PubMed - as supplied by publisher]

Expert Opin Biol Ther. 2013 May 25. [Epub ahead of print]

Embryonic stem cells as a treatment for macular degeneration.

Pan CK, Heilweil G, Lanza R, Schwartz SD.

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Introduction: Retinal degenerations are typically characterized by loss of highly differentiated cell types within the neurosensory retina, such as photoreceptors, or retinal pigment epithelium (RPE). RPE loss is the final common pathway in a number of degenerations including the leading cause of new blindness in the developed world: age-related macular degeneration (AMD).

Areas covered: This paper presents the pathophysiologic case for RPE transplantation with stem cell (SC)-derived tissue, a review of the preclinical data substantiating the hypothesis and the initial clinical trials safety data from early human trials.

Expert opinion: Targeting the RPE for transplantation with SC-derived tissue presents a reasonable therapeutic opportunity in a variety of important, otherwise untreatable, blinding conditions. Success of cellular replacement strategies is contingent on finding a viable source of replacement cells, establishing a safe technique for delivery and survival of transplanted cells within the host, restoration of normal retinal architecture and stabilization or improvement of vision.

PMID: 23705996 [PubMed - as supplied by publisher]

Development. 2013 Jun;140(12):2576-85. doi: 10.1242/dev.092270.

Stem cells in retinal regeneration: past, present and future.

Ramsden CM, Powner MB, Carr AJ, Smart MJ, da Cruz L, Coffey PJ.

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Abstract: Stem cell therapy for retinal disease is under way, and several clinical trials are currently recruiting. These trials use human embryonic, foetal and umbilical cord tissue-derived stem cells and bone marrow-derived stem cells to treat visual disorders such as age-related macular degeneration, Stargardt's disease and retinitis pigmentosa. Over a decade of analysing the developmental cues involved in retinal generation and stem cell biology, coupled with extensive surgical research, have yielded differing cellular approaches to tackle these retinopathies. Here, we review these various stem cell-based approaches for treating retinal diseases and discuss future directions and challenges for the field.

PMID: 23715550 [PubMed - in process]

Histol Histopathol. 2013 May 30. [Epub ahead of print]

Adipose derived mesenchymal stem cells partially rescue mitomycin C treated ARPE19 cells from death in co-culture condition.

Singh AK, Srivastava GK, García-Gutiérrez MT, Pastor JC.

Instituto Universitario de Oftalmobiología Aplicada (IOBA), Universidad de Valladolid, Valladolid, Spain.

Abstract: Age-related macular degeneration is a retinal disease with important damage at the RPE layer. This layer is considered a target for therapeutical approaches. Stem cell transplantation is a promising option for retinal diseases. Adipose derived mesenchymal stem cells secret growth factors which might play a significant role in RPE maintenance. This study aimed to evaluate human AD-MSCs ability to rescue mitomycin C treated dying ARPE19 cells in co-culture condition. ARPE19 cells were treated with MMC

(50µg/ml, 100µg/ml and 200µg/ml) for 2 hours to induce cell death. These treated cells were co-cultured with hAD-MSCs in indirect co-culture system for 3 days and 3 weeks. Then the viability, growth and proliferation of these ARPE19 cells were evaluated by a cell viability/cytotoxicity assay kit and Alamar Blue (AB) assay. Untreated ARPE19 cells and human skin fibroblasts (HSF) were used as controls. MMC blocked ARPE19 cell proliferation significantly in 3 days and cells were almost completely dead after 3 weeks. Cell toxicity of MMC increased significantly with concentration. When these cells were co-cultured with hAD-MSCs, a significant growth difference was observed in treated cells compared to untreated cells. hAD-MSCs rescue capacity was also significantly higher than HSF for treated ARPE19 cells. This study showed that hAD-MSCs rescued MMC treated ARPE19 cells from death. It probably occurred due to undefined growth factors secreted by hAD-MSCs in the medium, shared by treated ARPE19 cells in co-culture conditions. This study supports further evaluation of the effect of hAD-MSCs subretinal transplantation over the RPE degeneration process in AMD patients.

PMID: 23719745 [PubMed - as supplied by publisher]

Int Ophthalmol. 2013 May 31. [Epub ahead of print]

Ultraviolet light and ocular diseases.

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Abstract: The objective of this study is to review the association between ultraviolet (UV) light and ocular diseases. The data are sourced from the literature search of Medline up to Nov 2012, and the extracted data from original articles, review papers, and book chapters were reviewed. There is a strong evidence that ultraviolet radiation (UVR) exposure is associated with the formation of eyelid malignancies [basal cell carcinoma (BCC) and squamous cell carcinoma (SCC)], photokeratitis, climatic droplet keratopathy (CDK), pterygium, and cortical cataract. However, the evidence of the association between UV exposure and development of pinguecula, nuclear and posterior subcapsular cataract, ocular surface squamous neoplasia (OSSN), and ocular melanoma remained limited. There is insufficient evidence to determine whether age-related macular degeneration (AMD) is related to UV exposure. It is now suggested that AMD is probably related to visible radiation especially blue light, rather than UV exposure. From the results, it was concluded that eyelid malignancies (BCC and SCC), photokeratitis, CDK, pterygium, and cortical cataract are strongly associated with UVR exposure. Evidence of the association between UV exposure and development of pinguecula, nuclear and posterior subcapsular cataract, OSSN, and ocular melanoma remained limited. There is insufficient evidence to determine whether AMD is related to UV exposure. Simple behavioural changes, appropriate clothing, wearing hats, and UV blocking spectacles, sunglasses or contact lens are effective measures for UV protection.

PMID: 23722672 [PubMed - as supplied by publisher]

Invest Ophthalmol Vis Sci. 2013 May 30. pii: iovs.12-10734v1. doi: 10.1167/iovs.12-10734. [Epub ahead of print]

Clinical and microperimetric predictors of reading speed in low vision patients: a structural equation modelling approach.

Giacomelli G, Virgili G, Giansanti F, Sato G, Cappello E, Cruciani F, Varano M, Menchini U.

Department of Specialized Surgical Sciences, University of Florence, Viale Morgagni 85, Florence, 50134, Italy.

PURPOSE: To investigate the simultaneous association of several psychophysical measures with reading ability in patients with mild and moderate low vision attending rehabilitation services.

METHODS: Standard measurement of reading ability (MNREAD charts), visual acuity (ETDRS charts), contrast sensitivity (Pelli-Robson charts), reading contrast threshold (REX charts), retinal sensitivity and fixation stability and localization (MP1 fundus perimetry) were obtained in 160 low-vision patients with better -eye visual acuity from 0.3 to 1.0 logMAR and affected by either age-related macular degeneration or diabetic retinopathy.

RESULTS: All variables were moderately associated with reading performance measures (MNREAD reading speed and acuity, REX contrast threshold), as well as among each other. In a SEM model, REX reading contrast threshold was highly associated to reading speed (standardized coefficient 0.63) and moderately associated to reading acuity (-0.30). The REX test also mediated the effect of Pelli-Robson contrast sensitivity (0.44), MP1 fixation eccentricity (-0.19) and mean retinal sensitivity (0.23) on reading performance. MP1 fixation stability was associated with both reading acuity (-0.24) and speed (0.23), while ETDRS visual acuity only affected reading acuity (0.44).

CONCLUSIONS: Fixation instability and contrast sensitivity loss are key factors limiting reading performance of patients with mild or moderate low vision. REX charts directly assess the impact of text contrast on letter recognition and text navigation and may be a useful aid in reading rehabilitation.

PMID: 23722392 [PubMed - as supplied by publisher]

Retina. 2013 May 24. [Epub ahead of print]

SYMPTOMATIC VITREOMACULAR ADHESION.

Jackson TL, Nicod E, Simpson A, Angelis A, Grimaccia F, Kanavos P.

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BACKGROUND: Symptomatic vitreomacular adhesion describes symptomatic loss of visual function as a result of vitreous traction at the macula.

METHODS: Literature review.

RESULTS: Symptomatic vitreomacular adhesion can occur in isolation as vitreomacular traction, which may lead to the development of a macular hole, or it may occur alongside epiretinal membrane. It is likely to be associated with age-related macular degeneration and possibly diabetic maculopathy, although this is less certain. The treatment depends largely on the cause, but options include observation, vitrectomy, and pharmacologic vitreolysis. Small uncontrolled trials have also explored the use of an intravitreal gas bubble as a means of releasing VMA. If all cases of sVMA are considered together, then the burden of illness is substantial, with a prevalence of ~0.35 per 100 population (excluding epiretinal membrane). Furthermore, there may be many more cases of undiagnosed sVMA.

CONCLUSION: The recent introduction of ocriplasmin is likely to increase interest in sVMA. Clinical trials suggest that it has a role in the treatment of vitreomacular traction and Stages 1 to 3 macular holes but not primarily as a treatment of epiretinal membrane. Its role in other diseases associated with VMA remains to be determined.

PMID: 23714857 [PubMed - as supplied by publisher]

Pathogenesis

Nihon Eiseigaku Zasshi. 2013;68(2):118-25.

Development of a monitor for quantifying personal eye exposure to visible and ultraviolet radiation and its application in epidemiology.

Eto N, Tsubota K, Tanaka T, Nishiwaki Y.

Department of Biomedical Engineering, School of Engineering, Tokai University.

Objective: Eye diseases including cataract, keratitis and pterygium have been reported to be sun-exposure-related. The association between macular degeneration and blue light has also been discussed. Moreover, it is hypothesized that retinal exposure to blue light may influence the human circadian rhythm. However, no monitoring devices exist that can measure eye exposure to visible and ultraviolet (UV) radiation over time. To measure the exact dose at specific times, we have developed a novel sensing system (ray-sensing glass system: RaySeG).

Methods: RaySeG can continuously measure and record the composition and intensity of light with a time-stamped system. Subjects wearing RaySeG were instructed to walk under various light conditions such as indoor and outdoor.

Results: RaySeG consists of two sensors embedded in the eyeglasses. These sensors are for UV (260-400 nm), visible lights (red, 615 nm; green, 540 nm; and blue, 465 nm: peak wavelength for each). The total weight of the system is about 100 g, and the size is comparable to that of a digital audio player. The system continuously recorded changes in visible and UV light exposure under various conditions.

Conclusions: After accuracy validation, further experiments with a larger number of subjects are required. Our final goal is to apply the system to evaluating personal eye exposure to UV and visible light in epidemiological studies of eye diseases and circadian rhythm abnormality.

PMID: 23718973 [PubMed - in process]

Epidemiology

JAMA Ophthalmol. 2013 Apr;131(4):499-506.

Vision insurance, eye care visits, and vision impairment among working-age adults in the United States.

Li YJ, Xirasagar S, Pumkam C, Krishnaswamy M, Bennett CL.

Department of Health Services Policy and Management, Arnold School of Public Health, University of South Carolina, USA.

OBJECTIVES: To compare rates of eye care visits and vision impairment among working-age adults with vision insurance vs without, among the total sample of Behavioral Risk Factor Surveillance Survey respondents and among a subsample of respondents who had diagnoses of glaucoma, age-related macular degeneration (ARMD), and/or cataract.

DESIGN: Using the Behavioral Risk Factor Surveillance Survey 2008 vision module data, we examined the likelihood of an eye care visit within the past year and of self reported visual impairment among 27 152 adults aged 40 to 65 years and among a subset of 3158 persons (11.6%) with glaucoma, ARMD, and/or cataract. Multivariate logistic regression models were used.

RESULTS: About 40% of both the study population and the subsample with glaucoma, ARMD, and/or cataract had no vision insurance. Respondents with vision insurance were more likely than those without to

have had eye care visits (general population adjusted odds ratio [AOR], 1.90 [95% CI, 1.89-1.90]; glaucoma -ARMD-cataract subsample AOR, 2.15 [95% CI, 2.13-2.17]), to have no difficulty recognizing friends across the street (general population AOR, 1.24 [95% CI, 1.22-1.26]; eye-disease subsample AOR, 1.45 [95% CI, 1.42-1.49]), and to have no difficulty reading printed matter (general population AOR, 1.34 [95% CI, 1.33-1.35]; eye-disease subsample AOR, 1.37 [95% CI, 1.34-1.39]). Respondents from the total sample who had an eye care visit were better able to recognize friends across the street (AOR, 1.07) and had no difficulty reading printed matter (AOR, 1.70), and respondents from the eye-disease subsample who had an eye care visit also were better able to recognize friends across the street (AOR, 1.71) and had no difficulty reading printed matter (AOR, 1.45).

CONCLUSIONS: Lack of vision insurance impedes eye care utilization, which, in turn, may irrevocably affect vision. Vision insurance for preventive eye care should cease to be a separate insurance benefit and should be mandatory in all health plans.

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Genetics

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Age-related Macular Degeneration- Clinical review and genetics update.

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Abstract: Age-related macular degeneration (AMD) is the leading cause of central vision impairment in persons over the age of 50 years in developed countries. Both genetic and non-genetic (environmental) factors play major roles in AMD etiology, and multiple gene variants and lifestyle factors such as smoking have been associated with the disease. While dissecting the basic etiology of the disease remains a major challenge, current genetic knowledge has provided opportunities for improved risk assessment, molecular diagnosis and clinical testing of genetic variants in AMD treatment and management. This review addresses the potential of translating the wealth of genetic findings for improved risk prediction and therapeutic intervention in AMD patients. Finally, we discuss the recent advancement in genetics and genomics and the future prospective of personalized medicine in AMD patients.

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ASSOCIATION BETWEEN POLYMORPHISM OF THE DNA REPAIR SMUG1 AND UNG GENES AND AGE-RELATED MACULAR DEGENERATION.

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PURPOSE: To investigate the association between the g.4235T>C (rs2337395) polymorphism of the UNG gene and the c.-31A>G (rs3087404) polymorphism of the SMUG1 gene and the risk of age-related macular degeneration (AMD), as well as modulation of this association by some environmental and lifestyle factors.

METHODS: Overall, 272 AMD patients and 105 control subjects were enrolled in this study. Both

polymorphisms were genotyped by restriction fragment length polymorphism-polymerase chain reaction (PCR-RFLP).

RESULTS: The C/C genotype of the g.4235T>C polymorphism of the UNG gene was associated with an increased risk of dry AMD (odds ratio, 2.54), whereas the T/T genotype of this polymorphism decreased such risk (odds ratio, 0.41). The presence of the T allele of the g.4235T>C polymorphism and the A allele of the c.-31A>G polymorphism of the SMUG1 gene (odds ratio, 2.17 and 2.18, respectively) was associated with an increased risk of AMD severity, expressed by the comparison of the frequencies of genotypes in the group of patients with wet AMD versus those with dry AMD. Conversely, the C/C genotype of the g.4235T>C polymorphism, the G/G genotype of the c.-31A>G polymorphism, and the C/C-G/G combined genotype of both polymorphisms had a protective effect (odds ratio, 0.48, 0.46, and 0.18; respectively).

CONCLUSION: The results obtained suggest the potential role of the g.4235T>C and the c.-31A>G polymorphisms in AMD pathogenesis.

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