

# Journal Highlights

## NEW FINDINGS FROM *OPHTHALMOLOGY*, *AJO*, AND *JAMA OPTHALMOLOGY*

### ***Ophthalmology***

#### **Dietary Patterns and AMD Risk**

Published online Feb. 21, 2014

**C**an an individual's diet reduce the risk of developing age-related macular degeneration (AMD)?

Islam et al. turned to the Melbourne Collaborative Cohort Study (MCCS), the largest single-cohort study with comprehensive data on both diet and AMD status, to assess this issue.

At baseline (1990-1994), the MCCS included 41,514 participants. Dietary data were collected using a self-administered food questionnaire; macular images were collected during the follow-up period (2003-2007). All told, 19,768 participants were evaluated during follow-up. Information on family history of AMD was not obtained, and genotyping was not performed.

Of the 19,768 follow-up participants, 2,508 (12.7 percent) had early stages of AMD, and 108 (0.55 percent) had advanced AMD. After adjusting for age, gender, smoking, multivitamin use, and total calorie intake, the researchers found that a diet characterized by frequent consumption of rice, fish (not fried), chicken (not fried), a variety of vegetables, and an avoidance of white bread was associated with a lower prevalence of developing ad-

vanced AMD. In contrast, a diet characterized by a greater intake of red and processed meats and fried foods was associated with a higher prevalence of the disease. However, no particular dietary patterns were found to be associated with the early stages of AMD.

The researchers noted that even

though the results of their analysis cannot reveal the absolute amounts of foods to eat or avoid, they do point in the direction of the optimal dietary path to follow when one is attempting to reduce the risk of developing AMD.



#### **Iris Thickness and Outcomes of Prophylactic LPI**

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**H**ow does iris thickness influence the outcomes of laser peripheral iridotomy (LPI) in patients at risk of primary angle-closure glaucoma (PACG)? Lee et al. addressed this question by evaluating three baseline measurements of iris thickness and measuring three anterior segment biometric parameters following LPI. They found that eyes with thinner irides were more likely to experience a flattening of the iris convexity and widening of the anterior chamber angle.

For this prospective clinical cohort

study, the researchers evaluated 52 eyes of 52 PACG suspects with anatomically narrow angles. Iris thickness measurements were taken before and after laser treatment. All LPIs were performed by the same ophthalmologist. The results indicated that lower baseline measurements at two positions—maximal iris thickness and iris thickness 2,000  $\mu\text{m}$  from the scleral spur—were associated with a greater decrease in iris curvature following LPI. A lower baseline measurement at the third position—iris thickness 750  $\mu\text{m}$  from the scleral spur—was associated with an increase in the trabecular-iris space area following LPI.

Incorporating measurements of iris thickness in the risk-benefit analysis may help ophthalmologists refine patient selection when considering prophylactic LPI, the researchers said. At the least, doing so may help clinicians identify those patients whose angles may remain narrow after the procedure is performed, they added.

#### **Fewer Complications Seen With PACK-CXL for Infectious Keratitis**

Published online Feb. 26, 2014

**S**aid et al. tested the efficacy and safety of corneal collagen cross-linking with photoactivated riboflavin (PACK-CXL) in patients with infectious keratitis with corneal melting. Although PACK-CXL did not shorten the overall time to corneal

healing, fewer complications occurred in the treatment group.

This prospective trial involved 40 eyes from 40 patients with advanced infectious keratitis and coexisting corneal melting. *Staphylococcus* and *Aspergillus* were the most common causative bacterial and fungal microorganisms. Twenty-one patients were randomized to the PACK-CXL group and 19 to the control group. All patients received antimicrobial therapy consisting of topical vancomycin, topical ceftazidime, and oral itraconazole.

The two groups had roughly similar outcomes in terms of healing time and corrected distance visual acuity (VA). The average healing time was  $39.76 \pm 18.22$  days in the PACK-CXL group and  $46.05 \pm 27.44$  days in the control group; final average VA (logMAR) was  $1.64 \pm 0.62$  in the PACK-CXL group and  $1.67 \pm 0.48$  in the control group.

However, the two groups diverged in their rates of serious complications. The final complication rate for the control group was 21 percent (three patients had a corneal perforation, and one patient experienced a recurrence of infection). In contrast, no patients in the treatment group experienced significant complications.

The researchers reported that this is the first study of PACK-CXL to include a series of more than seven eyes and a control group, and they concluded that the treatment may be a valuable adjuvant therapy in cases of infectious keratitis with corneal melting.

### When to Suspect Orbital Granulomatosis With Polyangiitis

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**T**an et al. evaluated patients who presented with orbital granulomatosis with polyangiitis (GPA; also known as Wegener granulomatosis) over a 21-year period, with the goal of identifying those clinical and imaging characteristics of greatest diagnostic and prognostic value for orbital GPA. They found that clinicians should strongly consider the possibility of GPA when a patient presents with an orbital mass and sinonasal symptoms

or imaging shows sinonasal involvement or paranasal bone erosion.

For this retrospective noninterventional, comparative case series, the authors reviewed 247 patients who had undergone orbital biopsies for clinical presentations with orbital inflammation at Moorfields Eye Hospital in London. The patients were classified as GPA ( $n = 37$ ) or non-GPA ( $n = 210$ ) on the basis of their final clinical diagnosis. Patients with GPA were further classified as having either systemic ( $n = 8$ ) or localized orbital disease ( $n = 29$ ).

Most orbital GPA presented as an orbital mass or with lacrimal symptoms, the researchers reported. Presentation with sinonasal clinical features (such as chronic sinusitis, nasal discharge, and lacrimal sac infection) was more frequent in the GPA group. Ocular inflammation occurred in 27 percent of GPA patients and was a presenting feature in 8 percent. When imaging results were available, GPA patients had more evidence of sinonasal disease or bone erosion on imaging. Loss of the nasal septum occurred only in patients with GPA, and bone erosion in this group was independent of systemic involvement.

The presence of combined ocular and orbital inflammation should raise the suspicion of GPA, the researchers said, and they emphasized that midfacial bone erosion and destruction of the nasal septum are good predictors of GPA in these patients.

### *American Journal of Ophthalmology*

#### Aberrometry in Patients With Accommodative Intraocular Lenses

May *AJO*

**P**érez-Merino et al. investigated the objective accommodative response, change of aberrations, and depth of focus in eyes implanted with the Crystalens accommodative intraocular lens (IOL) in a prospective observational study. Ocular aberrations were measured by means of laser ray tracing aberrometry for different accommodative demands in patients

who had a Crystalens. Ocular aberrations were used to estimate the objective accommodative response and depth of focus.

Eleven cataract patients (22 eyes) who underwent implantation of a Crystalens accommodative IOL were compared against two control groups: one consisting of nine young (mean age,  $28 \pm 4$  years), phakic subjects (17 eyes), and the other of 17 age-matched pseudophakic patients (17 eyes) implanted with monofocal IOLs. A custom-developed laser ray tracing aberrometer was used to measure the optical aberrations. Measurements were obtained under dilated and natural viewing conditions. The accommodative response was obtained by analyzing changes in paraxial defocus and by evaluating the differences in the effective defocus with the accommodative demand. Depth of focus was estimated from through-focus objective optical quality.

Wave aberration measurements were highly reproducible. Several subjects showed changes in astigmatism, spherical aberration, trefoil, and coma with accommodation, which the researchers attributed to geometrical and alignment changes in the lens with accommodative demand. The accommodative response of eyes implanted with Crystalens IOLs, measured objectively using laser ray tracing aberrometry, was lower than 0.4 D in all eyes. However, depth of focus was statistically significantly higher in Crystalens eyes compared with both control groups. Pseudoaccommodation from increased depth of focus may contribute to near-vision functionality in Crystalens-implanted patients.

#### Chorioretinal Folds: Associated Disorders and a Related Maculopathy

May *AJO*

**C**horioretinal folds (CRFs) may be associated with multiple systemic, orbital, and ophthalmologic disorders, reported Olsen et al. in a case series of patients with clinical signs of CRFs. In addition, the authors described three stages of chorioretinal fold maculopathy that can, over time,

develop into a condition resembling occult choroidal neovascularization. The natural course of this maculopathy is for a slow, mild loss of central visual acuity.

In this retrospective chart study, the authors reviewed the medical histories, imaging studies, and systemic diagnostic evaluations of 40 consecutive patients (57 affected eyes) with CRF. The mean age at diagnosis was 64 years. Overall, the mean presenting visual acuity was 20/50, declining slightly to 20/60 over  $19 \pm 30$  months; 18 patients were hyperopic.

Ten eyes had stage 3 CRF-related maculopathy, the most advanced form, which was more common in older individuals with more chronic CRFs. Four of the stage 3 eyes had associated choroidal neovascularization, and these eyes had 20/60 presenting visual acuity that decreased to 20/100 over approximately 1.5 years. Stage 3 eyes without choroidal neovascularization had a mean presenting visual acuity of 20/40 that decreased to 20/65 over 2.1 years. The authors noted that limited and cautious treatment with anti-vascular endothelial growth factor agents may be beneficial during select stages of this maculopathy.

Overall, half of the 40 patients with CRFs had some type of autoimmune disorder, including rheumatoid arthritis, posterior scleritis, thyroid eye disease, and inflammatory bowel disease. The authors noted that clinicians need to be aware of the many systemic conditions associated with CRFs. They recommended a careful medical history and examination for inflammatory, neoplastic, infectious, and infiltrative disorders in patients with this important clinical sign.

### **JAMA Ophthalmology**

#### **A Randomized Clinical Trial Evaluating Vision Restoration Training for Glaucoma**

April *JAMA Ophthalmology*

**V**isual field loss due to retinal damage is considered irreversible. Sabel and Gudlin investigated

whether behavioral vision training, which has been shown to improve visual fields in hemianopia and optic nerve damage, could help to achieve vision restoration in glaucoma as well. To explore this possibility, the authors designed a randomized clinical trial to determine whether behavioral activation of areas of residual vision—by means of daily one-hour vision restoration training for glaucoma for three months—could improve detection accuracy compared with placebo in an ambulatory care and home training setting.

Patients with glaucoma (mean age, 61.7 years; age range, 39-79 years) with stable visual fields and well-controlled IOP were enrolled. After randomization, four study participants withdrew from the trial because of either mild headaches ( $n = 2$ ) or lack of time to complete the scheduled training ( $n = 2$ ).

The interventions included computer-based vision restoration training for glaucoma ( $n = 15$ ) or visual discrimination training (placebo) in the intact visual field ( $n = 15$ ). The primary end point was change in detection accuracy on high-resolution perimetry. Secondary end points were 30-degree white-on-white and 30-degree blue-on-yellow near-threshold perimetry, as well as reaction time, eye movements, and vision-related and health-related quality of life. Vision restoration training for glaucoma led to detection accuracy gains in high-resolution perimetry ( $p = .007$ ), which were not found with white-on-white or blue-on-yellow perimetry. Furthermore, the before-and-after differences in patients who took the vision restoration training for glaucoma were greater than those found in the placebo group on all perimetry tests ( $p = .02$  for high-resolution perimetry,  $p = .04$  for white on white, and  $p = .04$  for blue on yellow). These results were independent of eye movements. Vision restoration training for glaucoma (but not placebo) also led to faster reaction time ( $p = .009$ ). Differences in vision-related quality of life were not identified, although the health-related quality-of-life mental health domain

subscale increased in both groups.

These results suggest that visual field defects caused by glaucoma can be improved by repetitively activating residual vision through training the visual field borders and areas of residual vision, thereby increasing their detection sensitivity. The authors proposed that neuroplasticity of the visual cortex or higher cortical areas is the mechanism of action.

#### **Race and Visual Outcome After Acute Optic Neuritis**

April *JAMA Ophthalmology*

**R**etrospective studies have demonstrated disparate outcomes following acute optic neuritis in individuals of black race/ethnicity compared with individuals of white race/ethnicity. However, published analyses of data from the Optic Neuritis Treatment Trial (ONTT), a prospective randomized controlled trial, did not identify any association between worse visual outcomes and black race/ethnicity. Therefore, Moss et al. investigated the associations of age, sex, and race/ethnicity with visual outcomes following acute optic neuritis through application of longitudinal data analysis techniques to the ONTT data set.

In this secondary analysis of the ONTT data set, the models included effects of treatment (placebo, oral prednisone, or intravenous methylprednisolone), time, and treatment by time interaction, as well as demographic covariates of age, sex, and race/ethnicity. The ONTT data were collected at multiple centers in the United States. Patients of black ( $n = 58$ ) and white ( $n = 388$ ) race/ethnicity with acute optic neuritis who enrolled in the ONTT within eight days of symptom onset were included in analyses. The main outcomes and measures were the contrast sensitivity and visual acuity (logMAR) in the affected eye and were modeled using two-stage mixed-effects regression techniques. All available follow-up data from baseline to 15 to 18 years were included. The data identified no

relationship between age, sex, or treatment and the contrast sensitivity or visual acuity outcomes. However, race/ethnicity was correlated with contrast sensitivity ( $p < .001$ ) and visual acuity ( $p < .001$ ) during a 15-year period following acute optic neuritis, with black

race/ethnicity being associated with worse scores for both.

The authors concluded that race/ethnicity seems to be associated with contrast sensitivity and visual acuity outcomes in affected eyes following acute optic neuritis.

Ophthalmology summaries are written by Jean Shaw and edited by Susan M. MacDonald, MD. American Journal of Ophthalmology summaries are edited by Thomas J. Liesegang, MD. JAMA Ophthalmology summaries are based on authors' abstracts as edited by senior editor(s).

## ROUNDUP OF OTHER JOURNALS

### White Coats Act as Infection Vectors

*Infection Control and Hospital Epidemiology*

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Scrubs and white coats—and even neckties—may harbor harmful pathogens, reported **Bearman et al.** As a result, physicians should consider hanging up their traditional white coats before they see patients.

The authors conducted a review of the literature and hospital policies regarding attire on behalf of the Society for Healthcare Epidemiology of America. Although they found no research that directly linked physicians' apparel to hospital-acquired infections, they found abundant evidence that white coats, uniforms, and neckties may be colonized with pathogens such as *Staphylococcus aureus*, methicillin-resistant *S. aureus* (MRSA), *Clostridium difficile*, and vancomycin-resistant enterococci.

Individuals and institutions interested in minimizing the potential spread of these and other pathogens should take the following steps, the authors said. 1) A “bare-below-the-elbows” policy should be followed in clinical practice settings. This bans long sleeves, watches, and bracelets; ties are also included in this category. Sleeves can be rolled up, and ties can simply be tucked in, the authors noted. 2) White coats should be laundered daily and/or taken off and hung up before the physician or other health care worker interacts with a patient. 3) Shared equipment, such as stethoscopes, should be cleaned between patients. 4) Footwear should have closed toes. 5) Any clothing that touches pa-

tients should be laundered daily, using bacteria-eliminating protocols.

### Myopia Prevalence and Education Levels in Europe

*The Lancet*

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**Williams et al.** assessed the distribution and prevalence of myopia in Europe and explored whether it could be associated with higher levels of education. They found evidence that the prevalence of myopia is rising rapidly and confirmed the link with education.

For this meta-analysis, the researchers used data from population-based cohorts of the European Eye Epidemiology Consortium, encompassing nearly 59,000 patients who participated in 13 cohort studies. The studies were conducted between 1990 and 2012.

All told, the prevalence of myopia (defined as less than or equal to  $-0.75$  D) was 23.8 percent; high myopia (less than or equal to  $-6$  D) affected 2.1 percent of participants. Age stratification revealed that the prevalence of myopia was highest in the youngest cohort, with 42.3 percent of those aged 20 to 30 years affected by myopia, versus 29 percent of those aged 50 to 60 years. In addition, a cohort effect emerged: For participants between the ages of 50 and 60, 22.6 percent of those born between 1930 and 1939 were myopic, versus 33 percent of those born between 1950 and 1959.

Finally, educational level was found to be significantly associated with myopia prevalence: 16 percent of those who had completed only primary education had myopia, versus 35 percent

of those who had completed higher education.

### Compound Restores Visual Function in Blind Mice

*Neuron*

Published online Feb. 19, 2014

**Tochitsky et al.** tested the ability of a synthetic small-molecule “photoswitch” to restore visual function in an animal model. They found that the photoswitch, named DENAQ, restored retinal responses to moderately bright white light that was similar in intensity to daylight.

The researchers described DENAQ as a red-shifted photoswitch compound that confers light sensitivity on voltage-gated ion channels. In this study, they tested DENAQ on 20 3- to 6-month-old rd1 mice (these mice lose nearly all rods and cones within one month after birth). The compound was delivered via a single intravitreal injection, and the effect of light on retinal ganglion cells was measured.

DENAQ restored light responses in every retina tested, with the beneficial effect of a single injection lasting for 2.1 days. Staining and histological analyses showed no evidence of adverse effects or toxicity.

The researchers noted that additional toxicity studies will be needed in large mammals before testing in humans can be considered. Nonetheless, they theorized that the compound may be appropriate for such diseases as retinitis pigmentosa or age-related macular degeneration.

Roundup of Other Journals is written by Jean Shaw and edited by Deepak P. Edward, MD.