

Journal Highlights

NEW FINDINGS FROM THE PEER-REVIEWED LITERATURE

Ophthalmology

Selected by George B. Bartley, MD

Mediterranean Diet Score and AMD: The European Eye Study

January 2017

Hogg et al. performed a population-based epidemiologic study to examine associations between adherence to a Mediterranean diet and the prevalence of age-related macular degeneration (AMD) in 7 European countries. They found that participants with the highest Mediterranean Diet Score (MDS) had the lowest levels of advanced neovascular AMD.

Participants included 5,060 individuals aged 65 years or older (mean age, 73.2; 55% women) who were randomly selected from study centers in Norway, Estonia, United Kingdom, France, Italy, Greece, and Spain. Full dietary data were available for 4,753. Participants underwent eye examination and digital retinal color photography. Images were graded at a single center, according to the International Classification System for age-related maculopathy, and were stratified according to the Rotterdam staging system into 5 exclusive stages (AMD 0-4) and a separate category of large drusen ($\geq 125 \mu\text{m}$). AMD 4 included neovascular AMD (nvAMD) and geographic atrophy.

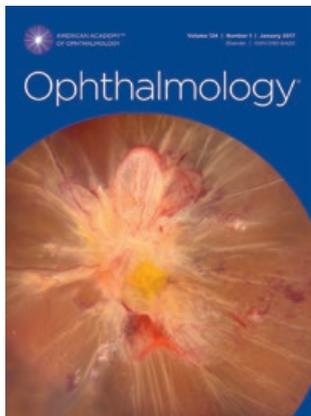
Dietary intake during the previous 12 months was assessed with a

semi-quantitative food-frequency questionnaire, from which the MDS (on a scale of 0-9) was determined. Multi-variable logistic regression was used to investigate the association between the MDS score and AMD. Among other factors, the researchers also looked for possible links between the MDS and the *Y204H* risk allele in AMD.

The researchers found that a higher MDS was associated with reduced odds of nvAMD in both unadjusted and confounder-adjusted analysis. Compared with participants with the lowest MDS adherence (≤ 4 score), those in the highest category of MDS (> 6 score) showed lower odds of

nvAMD (odds ratio, 0.53). No significant association was found with MDS for AMD grades 1-3. The researchers noted a weak trend between MDS and large drusen, with those in the highest category of MDS having 20% reduced odds compared with those in the lowest category. In this study, the association with MDS was not modified by the *Y204H* risk allele for any AMD stage.

In conclusion, this study adds to the limited evidence of the protective effect of adherence to a Mediterranean diet among those with late AMD, but it does not support earlier reports of a relationship with genetic susceptibility.



Long-Term Outcomes of Boston Keratoprosthesis Type II

January 2017

Lee et al. conducted a retrospective review of a consecutive clinical case series to assess long-term visual outcomes and complications after implantation of the Boston Keratoprosthesis type II (KPro II). It is considered a treatment of last resort in patients with severe ocular surface disease. Although use of the KPro II presents short- and longer-term challenges, the researchers found that it improved vision in a large proportion of the study patients with otherwise intractable corneal conditions.

The study—the largest and longest single-center case series—involved 48 eyes of 44 patients who underwent KPro type II implantation by 2 surgeons at Massachusetts Eye and Ear between January 1992 and April 2015; mean follow-up was 70.2 months. The most common indications were Stevens-Johnson syndrome (41.7%) and mucous membrane pemphigoid (41.7%). The main outcome measures were visual acuity, postoperative complications, and device retention.

Almost all patients (95.8%; 46 of 48 eyes) had a preoperative visual acuity of $\leq 20/200$. At the last postoperative visit, visual acuity had improved to $\geq 20/200$ in 37.5% (18 eyes) and to $\geq 20/100$ in 33.3% (16 eyes).

The most common postoperative complication was retroprosthetic membrane formation, occurring in 60.4% of eyes. The device extruded or had to be replaced in 50% of eyes. Of partic-

ular concern, glaucoma progressed in 27.1% of eyes and was newly diagnosed in 8.3%. Other complications were tarsorrhaphy revision (52.1%), retinal detachment (18.8%), infectious endophthalmitis (6.3%), and choroidal detachment or hemorrhage (8.3%).

The researchers concluded that despite these challenges, the Boston KPro type II is a viable option to salvage vision in patients who have poor prognosis with other corneal procedures.

Incidence and Growth of Geographic Atrophy During 5 Years of CATT

January 2017

Grunwald et al. estimated the incidence, size, and growth rate of geographic atrophy (GA) during 5 years of follow-up among participants receiving anti-VEGF therapy in the Comparison of Age-Related Macular Degeneration Treatments Trials (CATT). The authors found that development of GA was common at 5 years, and they identified several associated risk factors.

This was a cohort study within CATT. A total of 1,185 CATT participants were randomly assigned to ranibizumab or bevacizumab regimens. They were released from protocol treatment at 2 years and were examined at approximately 5 years ($n = 647$). Two masked graders assessed the presence and size of GA in digital color photographs (CPs) and fluorescein angiograms (FAs) taken at baseline and at years 1, 2, and 5.

The main outcome measures were presence of GA and its growth rate. Annual change in the square root of the total area of GA was the measure of growth. Multivariate linear mixed models, including baseline demographic, treatment, and ocular characteristics on CP/FA and optical coherence tomography (OCT) were used to analyze candidate risk factors.

Among the 1,011 participants who did not have GA at baseline and had follow-up images gradable for GA, the cumulative incidence was 12% at 1 year; 17% at 2 years; and 38% at 5 years. The authors found that the following baseline characteristics were associated with higher risk of develop-

ing GA: older age, hypercholesterolemia, worse visual acuity, larger choroidal neovascularization area, retinal angiomatous proliferation lesion, GA in the fellow eye, and intraretinal fluid. In contrast, a thicker subretinal tissue complex and the presence of subretinal fluid were associated with lower risk of developing GA.

The overall GA growth rate was 0.33 mm/year (standard error, 0.02 mm/year). Eyes treated with ranibizumab in the first 2 years of the clinical trial had a higher growth rate than those treated with bevacizumab (adjusted growth rate, 0.38 vs. 0.28 mm/year). GA in the fellow eye, hemorrhage, and absence of sub-RPE fluid at baseline were associated with a higher growth rate.

In conclusion, development of GA is common 5 years after initiation of therapy. In considering risk factors, the authors noted that the presence of subretinal fluid is associated with a lower incidence of GA, and the presence of sub-RPE fluid is associated with slower growth of GA. They stated that further research is needed to assess whether complete eradication of fluid under the retina should or should not be a goal for anti-VEGF therapy.

—Summaries by Marianne Doran

Ophthalmology Retina

Selected by Andrew P. Schachat, MD

Association Between Industry Payments and Anti-VEGF Use in Medicare Beneficiaries

January 2017

Mahr et al. conducted a cross-sectional database study to test for associations between anti-VEGF industry payments to ophthalmologists who provide intravitreal injections (IVI) and specific anti-VEGF agent use. They found that such payments were associated with higher odds of ranibizumab and aflibercept

use and lower odds of bevacizumab use; however, this association did not demonstrate cause and effect.

Participants in this study were U.S. fee-for-service Medicare beneficiaries and all ophthalmologists who submitted IVI claims for >10 Medicare beneficiaries between Aug. 1, 2013, and Dec. 31, 2013. The Sunshine Act Open Payments database was searched for all industry financial relationships in ophthalmology, and the Medicare Provider Utilization and Payment Database was searched for all IVI claims and anti-VEGF drug claims. The researchers used a novel algorithm to merge the 2 data sets and identify physician-specific associations between industry payments and use of anti-VEGF agents.

The researchers found that of 3,391 ophthalmologists who performed IVI, 1,187 (35%) received nonresearch payments from anti-VEGF industry. Of these, 422 (35%) received payments from Regeneron, 363 (31%) from Genentech, and 402 (34%) from both. When compared with ophthalmologists who perform IVI but do not receive anti-VEGF industry payments, those receiving Genentech payments (median, \$90; interquartile range [IQR], \$22-\$149) were more likely to use ranibizumab (odds ratio [OR], 2.14); those receiving Regeneron payments (median, \$55; IQR, \$22-\$131) were more likely to use ranibizumab (OR, 1.55) and aflibercept (OR, 1.23); those with payments from both manufacturers were more likely to use ranibizumab (OR, 2.69) and aflibercept (OR, 1.53); and all were less likely to use bevacizumab (OR, 0.33 to 0.64).

The researchers concluded that anti-VEGF industry payments to ophthalmologists who perform IVI are associated with a greater likelihood of use of higher-cost ranibizumab and aflibercept; they noted, however, that the findings demonstrate only an

Introducing Ophthalmology Retina

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association. They suggested that their algorithm could be used in future studies of physician payments and product utilization and may increase our understanding of the role of payments on physician decision-making.

Ocular Arterial Occlusive Disorders and Carotid Artery Disease

January 2017

Hayreh and Zimmerman carried out a large cohort study to compare the prevalence of carotid artery disease (CAD) and its various manifestations in patients with specific types of ocular arterial occlusive disorders. They found that the incidence of carotid artery stenosis and plaques, cardiac embolic source, transient ischemic attack (TIA)/stroke, and myocardial ischemia (MI) differ among various ocular arterial occlusive disorders.

The study included 614 patients (728 eyes) with an ocular arterial occlusive disorder: nonarteritic anterior ischemic optic neuropathy (NAION; 266 eyes), central retinal artery occlusion (CRAO; 203 eyes), branch retinal artery occlusion (BRAO; 127 eyes), ocular ischemic syndrome (OIS; 80 eyes), and amaurosis fugax (AF; 52 eyes). All patients also had CAD. At first visit, patients had a detailed ophthalmic and medical history, ophthalmic evaluation, carotid artery evaluation (by Doppler/angiography) on the side of ocular arterial occlusion, and echocardiography. The same ophthalmic evaluation was performed at each follow-up visit.

The authors found that carotid artery stenosis on the involved side was worse in AF and OIS compared with BRAO, CRAO, and NAION; whereas the presence of carotid artery plaques on the involved side was significantly higher in OIS, AF, and CRAO compared with NAION. Echocardiography revealed an embolic source in 61% of CRAO and 53% of BRAO patients compared with only 3% of NAION patients. TIA/stroke occurred before or after onset of the ocular condition in 17% of OIS, 11% of AF, 7% of CRAO, 6% of NAION, and 3% of BRAO patients. Kaplan-Meier estimate of the in-

cidence of TIA/stroke within 3 months after onset was 6% (95% CI, 2%-17%) for OIS, 3% (95% CI, 0.4%-19%) for AF, and 1% (95% CI, 0.3%-4.1%) for CRAO. Report of MI before or after onset of ocular condition was 52% in AF, 22% in OIS, 22% in BRAO, 21% in CRAO, and 6% in NAION patients.

The authors concluded that the incidence of carotid artery stenosis and plaques, cardiac embolic source, TIA/stroke, and MI differ among various ocular arterial occlusive disorders. Further, they noted that embolism and hemodynamic disturbances are independently associated with these ocular disorders. —Summaries by Peggy Denny

American Journal of Ophthalmology

Selected by Richard K. Parrish II, MD

As-Needed Aflibercept After the Phase 3 VISTA DME Trial: 12-Month Extension Study

January 2017

Wykoff et al. conducted a 12-month extension study to determine whether the results achieved with aflibercept for diabetic macular edema (DME) in the 3-year VISTA DME trial could be maintained with individualized as-needed (PRN) treatment. They found that vision gains were maintained throughout the extension period and that aflibercept was well tolerated.

Sixty patients entered the ENDURANCE extension study, in which they received PRN intravitreal aflibercept injections (IAIs) for clinically relevant DME. Patients were observed at intervals of 4, 8, or 12 weeks, depending on their need for treatment. Outcome measures included the number of IAIs given through month 12, the proportion of patients not requiring any IAI, assessment of adverse events, and the use of macular laser.

The mean number of IAIs administered in the extension study was 4.5. Eighteen patients (30%) required no IAI. Among patients who met the criteria for IAI retreatment, the mean number of IAIs was 6.0. The best-corrected visual acuity achieved during VISTA DME remained stable; fluctua-

tions from baseline were less than 1.5 (mean) letters at all assessment points of the extension study. IAI treatment was well tolerated, and no new safety signals emerged. The most common ocular adverse events were progressive diabetic retinopathy (n = 7; 12%) and worsening cataract (n = 6; 10%). Thirty-seven patients (62%) met the criteria for macular laser treatment, at a mean of 19.5 weeks. There was no significant difference in the frequency of IAIs before and after laser treatment.

CMV Retinitis in Pediatric Patients After Stem Cell Transplantation

January 2017

As part of their regimen for allogeneic hematopoietic stem cell transplantation (HSCT), patients must take immunosuppressant drugs. Thus, they have a high risk of reactivation of previously subclinical cytomegalovirus (CMV) infection, which may lead to CMV retinitis. Larochelle et al. conducted a cross-sectional study of pediatric patients who received allogeneic HSCT at Children's Hospital of Colorado and identified a cluster of CMV retinitis among patients treated in 2014, although no cases had been seen in the previous 4 years.

The authors retrospectively examined the records of 28 children who underwent allogeneic HSCT in 2014 and compared their rates of CMV viremia and CMV retinitis with those of 101 pediatric patients who had the same procedure between 2010 and 2013. Thirty-two patients (32%) in the earlier group tested positive for CMV viremia, but no cases of CMV retinitis were identified. Of the 28 patients who received HSCT in 2014, 13 patients (46%) had CMV viremia. Five cases of CMV retinitis were identified in this group, representing a significant increase from the previous 4 years.

Based on these findings and those of a multidisciplinary team that reviewed current literature, the authors developed a more aggressive ophthalmic screening protocol aimed at earlier detection of retinitis—while still asymptomatic—among pediatric HSCT recipients.

As part of this protocol, patients who become viremic or have CMV organ disease receive dilated eye exams starting within 2 weeks of viremia onset and continuing every 6-8 weeks until viremia is no longer detected.

The authors concluded that the burden of more-frequent exams is balanced by the benefits of earlier identification of CMV retinitis in this vulnerable patient population. Further, application of the protocol will help researchers determine whether the cluster was an anomaly or represents an actual increase in incidence of CMV.

—Summaries by Lynda Seminara

JAMA Ophthalmology

Selected by Neil M. Bressler, MD

Binocular iPad Game vs. Part-Time Patching for Amblyopia in Children

December 2016

There is a need for more effective, child-friendly options to treat amblyopia. Traditional therapies are disliked by patients and are associated with inadequate adherence. **Holmes et al.** compared visual acuity results for children treated with either part-time patching or a binocular iPad game and found that binocular treatment was less effective than patching.

This multicenter randomized noninferiority trial included 385 children (aged 5-12 years) whose amblyopia resulted from strabismus, anisometropia, or both. Patients in the binocular group ($n = 190$) were instructed to play the iPad game for 1 hour a day; those in the patching group ($n = 195$) were to wear a patch over their unaffected eye for 2 hours daily. Follow-up visits occurred at 4-week intervals through week 16.

By 16 weeks, the mean visual acuity of the amblyopic eye had improved 1.05 lines (2-sided 95% CI, 0.85-1.24 lines) in the binocular group and 1.35 lines in the patching group (2-sided 95% CI, 1.17-1.54 lines), with an adjusted treatment group difference of 0.31 lines favoring patching (upper limit of 1-sided 95% CI, 0.53 lines). This upper limit exceeded the prespecified noninferiority limit of 0.5 lines.

Only 39 (22%) of the 176 participants in the binocular group with log file data available performed more than 75% of their assigned treatment (median, 46%). Many lost interest in the game after several days or weeks. Among younger participants (from age 5 to 7 years) with no previous amblyopia treatment, visual acuity of the amblyopic eye improved by a mean of 2.5 lines in the binocular group and 2.8 lines in the patching group.

Although the primary noninferiority analysis was indeterminate, a post hoc analysis indicated that the improvement in visual acuity attained with this particular binocular game was not as good as that achieved by patching. In conclusion, the low rate of adherence to binocular treatment suggests that greater emphasis be given to adherence and to developing binocular apps that are more appealing to children, such as movies and first-person action games.

Oral Voriconazole for Fungal Keratitis in the MUTT II Trial

December 2016

Topical antifungals often are supplemented with oral medication for treatment of fungal keratitis, despite insufficient supporting evidence. **Prajna et al.** conducted a randomized controlled trial to determine whether the combination of topical antifungal eyedrops and oral voriconazole is more effective than topical antifungals alone. They found that oral voriconazole conferred no added benefit and increased the likelihood of adverse events.

This multicenter double-masked placebo-controlled randomized trial included 240 patients from India and Nepal with severe filamentous fungal keratitis and visual acuity of 20/400 or worse. All patients were treated with voriconazole (1%) and natamycin (5%) eyedrops and were randomized to receive oral voriconazole (119 patients) or placebo (121 patients). The main outcomes evaluated were rate of corneal perforation and need for therapeutic penetrating keratoplasty (PK) during 3 months of follow-up. Corneal lesions were examined with a slit-lamp bio-

microscope to assess re-epithelialization and dimensions of the infiltrate and scar. Levels of liver enzymes also were determined. Intention-to-treat statistical analysis was used.

Supplementing topical antifungal treatment with oral voriconazole did not reduce the likelihood of corneal perforation (voriconazole vs. placebo, 35 vs. 30 perforations) or the need for PK (49 vs. 56 PKs). These findings remained robust on sensitivity analyses. After correcting for baseline parameters, no between-group differences were noted in visual acuity, infiltrate or scar size, or rate of re-epithelialization. However, the patients who received oral voriconazole were significantly more likely to experience adverse events (58 vs. 28 events in placebo group), which included visual hallucinations and elevated levels of aspartate aminotransferase and alanine aminotransferase. When patients were subgrouped by infecting fungal genera, no significant difference in culture positivity was observed between oral voriconazole and placebo in any subgroup.

The authors concluded that oral voriconazole, when prescribed to patients with fungal keratitis as an adjuvant to topical antifungal treatment, confers no additional benefit but poses significant risks.

OCT Findings in Retinal Lesions of Infants With Zika Syndrome

December 2016

Maternal intrauterine infection with Zika virus (ZIKV) can cause severe ocular abnormalities in offspring. **Ventura et al.** performed a prospective cross-sectional study of 8 consecutive infants with congenital Zika syndrome (CZS) who were evaluated with optical coherence tomography (OCT). In addition to CZS manifestations that are typical of intrauterine ZIKV infection (e.g., microcephaly, hearing loss, limb malformations, and ocular anomalies), the authors found that CZS involves discontinuity of the ellipsoid zone, with retinal and choroidal thinning and hyperreflectivity beneath the retinal pigment epithelium (RPE).

The 8 patients (5 females, 3 males;

mean age, 4.1 months) were born in Pernambuco, Brazil, and received serologic testing to rule out other congenital infections. All patients had retinal lesions (determined by indirect ophthalmoscopy), and fundus examinations were performed at the initial visit. Cerebrospinal fluid samples were obtained from 7 of the 8 patients to determine whether ZIKV-specific IgM was present; all 7 had positive results. Seven patients were imaged by Fourier-domain OCT, and 1 patient underwent spectral-domain OCT. Because of the challenges associated with performing OCT in infants, some images could not be acquired.

On fundus examination, macular findings were chorioretinal scarring (10 of 16 eyes) and pigment mottling (7 eyes). Retinal abnormalities were observed in 11 of 16 eyes (69%). Of these 11 eyes, 9 were successfully scanned with OCT (1 unaffected eye was scanned). OCT of all 9 eyes (100%) indicated discontinuity of the ellipsoid zone and hyperreflectivity underlying the RPE. In addition, 8 eyes (89%) exhibited retinal thinning, 7 eyes (78%) had choroidal thinning, and 4 eyes (44%) showed colobomatous-like excavations of the retina, RPE, and choroid. Less common OCT findings included hyperreflective dots on the inner retinal layers (1 eye) and possible cleft (3 eyes).

To the authors' knowledge, this study is the first to employ OCT in the evaluation of retinal abnormalities in infants with presumed intrauterine ZIKV infection. They concluded that CZS is associated with severe damage to the choroid and to internal and external layers of the neurosensory retina.

—Summaries by Lynda Seminara

OTHER JOURNALS

Selected by Deepak P. Edward, MD

Causes and Correction of Dissatisfaction With Presbyopia-Correcting IOLs

Clinical Ophthalmology
2016;10:1965-1970

Gibbons et al. assessed the causes and potential solutions for patients who were dissatisfied after implantation

with presbyopia-correcting intraocular lenses (PC-IOLs). They found that the major causes of dissatisfaction were refractive error and dry eye.

The study was a retrospective review of clinical records of patients seen at Bascom Palmer Eye Institute between January 2009 and December 2013, whose primary complaint was dissatisfaction with visual performance after PC-IOL implantation (74 eyes of 49 patients). A single treating physician determined the probable cause of dissatisfaction and the intervention to address it.

The most common cause of dissatisfaction was blurred or foggy vision for both distance and near (68%). The authors attributed most of these complaints to residual refractive error (57%) or dry eye (35%). The most common interventions were management of residual refractive error with glasses or contact lenses (46%) and treatment for dry eye (24%). Corneal laser vision correction was performed in 8% of eyes, and 7% of eyes required an IOL exchange. After the interventions, 45% of patients had complete resolution of symptoms; 23% were partially satisfied with the results; and 32% remained completely dissatisfied.

The authors noted that most patients who undergo PC-IOL implantation are satisfied with the results. They concluded that the best ways to avoid patient dissatisfaction are 1) education on the risks and benefits so that patients will have reasonable expectations about outcomes, 2) aggressive identification and treatment of ocular surface disease, 3) selection of an appropriate refractive target, and 4) avoidance of patients with significant preexisting pathology.

Thyroid Dysfunction and 10-Year Incidence of AMD

Investigative Ophthalmology & Visual Science
2016;57(13):5273-5277

Epidemiological evidence on the possible relationship between thyroid dysfunction and age-related macular degeneration (AMD) is unclear. Thus, Gopinath et al. analyzed data from the Blue Mountains Eye Study (BMES) to assess the prospective associations

between serum thyroid-stimulating hormone (TSH) and free thyroxine (FT4) measurements, as well as thyroid dysfunction (hyperthyroidism and hypothyroidism) and the incidence of AMD. They found an independent association between overt hyperthyroidism and the incidence of AMD; thyroxine usage was also associated with AMD.

Categories of thyroid dysfunction were defined according to a serum TSH screen followed by serum FT4 assessment, and were available for 906 participants aged 55 years or older (the age group at risk for AMD). These parameters were not recorded at the original BMES baseline. Thus, the time frame for this study spanned BMES-2, 1997-1999, to BMES-3, 2007-2009. AMD was assessed from retinal photographs. The researchers also studied covariates, including history of smoking, frequency of consuming fish, and the presence of an AMD susceptibility gene.

After adjusting for covariates, the researchers found that participants with overt hyperthyroidism (low TSH and high FT4 levels) had a 3-fold increased risk of developing incident AMD compared with participants with normal thyroid function (odds ratio [OR], 3.51). Thyroxine usage was also positively associated with the incidence of AMD; those who reported current use of thyroxine had increased risk of incident AMD compared with nonusers (OR, 1.68). Similarly, participants who had ever taken thyroxine medication had a higher risk of AMD (OR, 1.91) than those who had never taken the drug. However, baseline serum TSH or FT4 levels per se did not show an association with 5- or 10-year incidence of AMD.

The researchers concluded that improved knowledge of risk factors could help to develop comprehensive screening strategies for AMD. They suggested that consideration of thyroid disease might contribute to a better profiling of AMD in clinical practice.

—Summaries by Marianne Doran



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American Journal of Ophthalmology

Selected by Richard K. Parrish II, MD

Anti-VEGF Agents: Industry Payments to Ophthalmologists

January 2017

Singh et al. reviewed national databases to analyze the characteristics of industry payments made to ophthalmologists related to anti-VEGF drugs and the possible effect on prescribing patterns. They found that providers who received >90% of payments related to ranibizumab or to aflibercept were more likely to use those branded drugs rather than bevacizumab, compared with those who received no payments.

Recent data (2013-2014) from the Open Payments General Payment dataset and the Provider Utilization and Payments database of the Centers for Medicare & Medicaid Services were examined to determine characteristics of industry payments related to aflibercept and ranibizumab, including dollar amounts, number and type of payments, and correlations between payments and providers' use of the medications for their patients. The analysis showed that 3,207 ophthalmologists received a total of 13,449 payments related to ranibizumab and aflibercept, representing a sum of \$4,454,325. The distribution was unequal among recipients: 90% of the payments were received by 7% of ophthalmologists (Gini index, 0.92).

Consulting fees and speaker fees were associated with the highest payment amounts to the fewest providers. For 2,383 providers (74%), >90% of

payments were exclusively for either ranibizumab or aflibercept. Compared with providers who received no payments for these agents, those who received >90% of payments from ranibizumab were more likely to prescribe ranibizumab than bevacizumab, and those who received >90% of payments from aflibercept were more likely to prescribe aflibercept than bevacizumab.

The authors concluded that, as more longitudinal data become available, greater insight may be gained about the relationship between provider payments and medication, as well as the cost impact of anti-VEGF agents on the health care system.

—Summary by Lynda Seminara

OTHER JOURNALS

Selected by Deepak P. Edward, MD

Biometric Factors Associated With Acute Primary Angle-Closure

Investigative Ophthalmology & Visual Science

2016;57(13):5320-5325

Atalay et al. compared ocular biometric and anterior segment parameters between the affected eye and fellow eye in 76 subjects with unilateral acute primary angle closure (APAC) who had undergone bilateral laser peripheral iridotomy before enrollment. The authors found that APAC eyes had smaller anterior segment dimensions than the fellow eyes. They also discovered that iris thickness is a strong predictor of angle width in both affected and fellow eyes.

The researchers used anterior seg-

ment optical coherence tomography with customized software to measure the following: angle opening distance (AOD750); trabecular-iris space area (TISA750); iris thickness (IT750); iris curvature (ICURV); iris area (IAREA); anterior chamber depth, area, and volume (ACD, ACA, and ACV); anterior chamber width (ACW); anterior vault (ACD+LV); lens vault (LV); and pupil diameter (PD). A-scan ultrasonography was used to measure axial length (AL) and lens thickness (LT). Mean differences in ocular biometric and anterior segment parameters were assessed with linear mixed model adjustment for PD.

In this cross-sectional study, 53 participants (36 females, 67.9%) with a mean age of 62.7 years were analyzed, after exclusion of 17 patients with unanalyzable images in at least 1 eye. Eyes affected by unilateral APAC had a shallower ACD and a smaller ACA, ACV, anterior vault, TISA750, AOD750, and ICURV (all comparisons, $p < .05$). In the affected eyes, IT750 was significantly associated with AOD750, whereas in the fellow eyes, IT750 and AL were predictive of AOD750 (all $p < .05$). Axial length, ACW, LV, LT, IAREA, and IT750 did not differ between the eyes.

The researchers noted that the mean ACD was, on average, 11.7% smaller in affected eyes when compared with fellow eyes, and they suggested that narrower angles and smaller anterior chamber parameters exacerbate angle crowding in such eyes. In addition, they identified a novel association between iris thickness and angle width in this study, accounting for approximately one-third of the variability in AOD750.

—Summary by Marianne Doran