

# AMERICAN JOURNAL OF OPHTHALMOLOGY®

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### EDITORIAL

- **A1 Should we expect the rise of Nd: YAG laser capsulotomies in the future?** *Andrzej Grzybowski and Raimo Tuuminen*

Posterior capsular opacification (PCO) is associated with health care costs, treatment burden, and rare adverse events. The different rates of Nd:YAG laser between monofocal and multifocal IOLs, and between nontoric and toric versions may help to explain the mechanisms of PCO formation, the effects of PCO on visual function in pseudophakic eyes with premium IOLs, and the future development of these lenses.

### PERSPECTIVE

- **92 Guidelines for Imaging the Choriocapillaris Using OCT Angiography.** *Zhongdi Chu, Qinqin Zhang, Giovanni Gregori, Philip J. Rosenfeld, and Ruikang K. Wang*

This Perspective provides an update on the latest optical coherence tomography angiographic strategies for imaging the choriocapillaris (CC) based on previous publications and offers guidance on how to appropriately visualize the CC and quantify various parameters based on the instrument and scan patterns used, the image processing methods chosen, and the thresholding strategies used to achieve accurate and reliable measurements.

- **277 Detection of Glaucoma Deterioration in the Macular Region with Optical Coherence Tomography: Challenges and Solutions.** *Kouros Nouri-Mahdavi and Robert E. Weiss*

This perspective addresses the challenges in detection of glaucoma progression using macular imaging with optical coherence tomography and provides potential solutions for

optimizing identification of structural change in the central retina in patients with glaucoma.

### ORIGINAL ARTICLES

- **1 Strabismus after Ahmed Glaucoma Valve implantation.** *Laura Robbins, Toshiaki Goseki, Simon K. Law, Kouros Nouri-Mahdavi, Joseph Caprioli, Anne L. Coleman, Joann A. Giacconi, Joseph L. Demer, Federico G. Velez, and Stacy L. Pineles*

In the largest single-center series of patients undergoing initial Ahmed glaucoma valve implantation, the overall prevalence of postoperative strabismus was 4%. Exotropia was the most common type of strabismus in both the superotemporal and superonasal Ahmed valve placement groups. Superotemporal Ahmed valves were more commonly associated with ipsilateral hypertropia than superonasal valves.

- **6 External Drainage Alone versus External Drainage with Vitrectomy in Advanced Coats Disease.** *Ahmet Yucel Ucgul, Sengul Ozdek, Mestan Ertop, and Hatice Tuba Atalay*
- This study demonstrates that the anatomical success rate of combined external drainage and vitrectomy was higher than that of external drainage alone (93.8% vs. 75%, respectively) in patients with advanced Coats disease, at an average follow-up of 34.8 months.

- **15 Revising the diagnosis of idiopathic uveitis by peripheral blood transcriptomics.** *James T. Rosenbaum, Christina A. Harrington, Robert P. Searles, Suzanne S. Fei, Amr Zaki, Sruthi Arepalli, Michael A. Paley, Lynn M. Hassman, Albert T. Vitale, Christopher D. Conrady, Puthyda Keath, Claire Mitchell, Lindsey Watson, Stephen R. Planck, Tammy M. Martin, and Dongseok Choi*

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Idiopathic uveitis is a common diagnosis made in referral clinics for patients with uveitis. Gene expression was characterized in peripheral blood from patients with types of uveitis often incorrectly diagnosed as idiopathic: sarcoidosis, interstitial nephritis with uveitis, inflammatory bowel disease, or axial spondyloarthritis. Among patients with idiopathic uveitis, about 30% had peripheral blood gene expression profiles that corresponded with one of these four diagnoses and that fit the pattern of uveitis expected with that diagnosis.

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• **24 Clinicopathologic correlations of retrocorneal membranes associated with endothelial corneal graft failure.** *Andrea Naranjo, Nathan Pirakitikulr, Daniel Pelaez, Alfonso L. Sabater, Pedro Monsalve, Guillermo Amescua, Anat Galor, and Sander R. Dubovy*

A clinicopathologic correlation of retrocorneal membranes associated with Descemet stripping automated endothelial keratoplasty failure was performed. Specimens from 7 patients (all with history of glaucoma drainage device surgery) who had clinically significant retrocorneal membranes at the time of graft failure were analyzed. Immunocharacterization demonstrated membranes to be negative for pancytokeratin and positive for  $\alpha$ -SMA, vimentin, CK7, N-cadherin, ZEB1, Snail, ROCK1, and RhoA. Positivity for endothelial-to-mesenchymal transition markers indicates possible endothelial origin and could be the hallmark for future targeted pharmacotherapy.

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• **34 Endophthalmitis after Descemet Stripping Endothelial Keratoplasty: Microbiological Yield and Visual Outcomes.** *Cason B. Robbins, Henry L. Feng, C. Ellis Wisely, Melissa Dahuwoy, and Sharon Fekrat*

This retrospective case series reports management and outcomes in 6 cases of endophthalmitis after Descemet stripping endothelial keratoplasty. Descemet stripping endothelial keratoplasty-related endophthalmitis may

cause severe vision loss—3 of 6 cases had light perception or no light perception at 6 months. Aqueous tap had higher microbiological yield than vitreous tap. Three of 6 eyes required subsequent vitrectomy for resolution of infection.

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• **41 Birth Weight Is a Significant Predictor of Retinal Nerve Fiber Layer Thickness at 36 Weeks Postmenstrual Age in Preterm Infants.** *Liangbo L. Shen, Shwetha Mangalesh, Brendan McGeehan, Vincent Tai, Neeru Sarin, Mays A. El-Dairi, Sharon F. Freedman, Maureen G. Maguire, and Cynthia A. Toth, for the BabySTEPS Group*

Retinal nerve fiber layer thickness was assessed in preterm infants at 36 weeks postmenstrual age using a handheld bedside optical coherence tomography system. Retinal nerve fiber layer was 3.4  $\mu$ m thicker in the right eyes than the left eyes. Among 7 characteristics of interest, birth weight was the only independent predictor of retinal nerve fiber layer thickness, suggesting that the reserve of retinal ganglion cells is affected by intrauterine processes that affect birth weight.

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• **54 Text Parsing-Based Identification of Patients with Poor Glaucoma Medication Adherence in the Electronic Health Record.** *Mohammed S. Hamid, Autumn Valicevic, Brianne Breneman, Leslie M. Niziol, Joshua D. Stein, and Paula Anne Newman-Casey*

Many glaucoma patients suffer from poor adherence to medications. In this study, a text-parsing system used to sift through free-text notes in the electronic health record was compared to validated surveys measuring self-reported adherence to medication. As a prescreening tool, using text parsing to locate physicians' comments on nonadherence in visit notes predicted a higher rate of patients' self-reporting poor adherence. Text parsing could be used to identify glaucoma patients who need additional self-management support.

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- **60 The Michigan Retinal Degeneration Questionnaire: a Patient-Reported Outcome Instrument for Inherited Retinal Degenerations.** *Gabrielle D. Lacy, Maria Fernanda Abalem, Chris A. Andrews, Lilia T. Popova, Erin P. Santos, Gina Yu, Hanan Y. Rakine, Natasha Baig, Joshua R. Ehrlich, Abigail T. Fahim, Kari H. Branham, Joan A. Stelmack, Bonnielin K. Swenor, Gislin Dagnelie, David C. Musch, and K. Thiran Jayasundera*

The Michigan Retinal Degeneration Questionnaire is a psychometrically validated patient-reported outcome measure for patients with inherited retinal degenerations. The 59-item questionnaire encompasses 7 domains representative of physiological visual function pathways: central vision, color vision, contrast sensitivity, scotopic function, photopic peripheral vision, mesopic peripheral vision, and photosensitivity.

- **69 Reoperation Rates of Patients Undergoing Primary Noncomplex Retinal Detachment Surgery in a Cohort of the IRIS Registry.** *Prethy Rao, Richard Kaiser, Flora Lum, Elizabeth Atchison, David W. Parke II, and George A. Williams*

This is a retrospective IRIS Registry cohort study comparing the 12-month reoperation rates after a primary noncomplex retinal detachment repair. The reoperation risk for a noncomplex retinal detachment repair varies with age: lower odds for scleral buckles compared with a vitrectomy ± scleral buckle if ≤50 years old and lower risk for PPV ± SB if >50 years old.

- **76 Assessment of respiratory droplet transmission during the ophthalmic slit-lamp exam: a particle tracking analysis.** *Sahil H. Shah, Anupam K. Garg, Shiv Patel, Wonjun Yim, Jesse V. Jokerst, and Daniel L. Chao*

This cough simulation study was used to determine effects of personal protective equipment using a fluo-

rescent surrogate of respiratory droplets during a slit-lamp examination. The study found that surgical masks were the most effective in limiting spread of respiratory droplets, whereas slit-lamp shields and gloves also contributed to limiting exposure. This study adds to the objective data behind the rationale of current personal protective equipment recommendations for the slit-lamp examination during the COVID-19 era.

- **82 Outcomes of Cultivated Oral Mucosal Epithelial Transplantation in Eyes With Chronic Stevens-Johnson Syndrome Sequelae.** *Renu Venugopal, Ritu Nagpal, Sujata Mohanty, Seema Sen, Seema Kashyap, Tushar Agarwal, Prafulla K. Maharana, Rasik B. Vajpayee, and Namrata Sharma*

The results indicate that COMET allows successful and sustained restoration of ocular surface anatomy with functional improvement in eyes with chronic sequelae of SJS.

- **102 Three-dimensional morphogeometric and volumetric characterization of cornea in pediatric patients with early keratoconus.** *Ibrahim Toprak, Francisco Cavas, José S. Velázquez, Jorge L. Alió del Barrio, and Jorge L. Alió*

The current study presents morphogeometric and volumetric characterization of corneas in pediatric patients with early and mild keratoconus (KC) using a 3-dimensional corneal model. In pediatric patients, posterior corneal apex appears to deviate from vertex beginning from early KC, whereas anterior apex deviation manifests when KC evolves. Posterior apex deviation, difference between anterior-posterior deviation, and volumetric distribution profiles might add value in detection of early KC in pediatric patients.

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- **112 Multimodal imaging features and clinical relevance of subretinal lipid globules.** *Pedro Fernández-Avellaneda, K. Bailey Freund, Reeking K. Wang, Qinghua He, Qinqin Zhang, Serena Fragiotta, Xiaoyu Xu, Gerardo Ledesma-Gil, Yoshimi Sugiura, Mark P. Breazzano, Lawrence A. Yannuzzi, Sandra Liakopoulos, David Sarraf, and Rosa Dolz-Marco*

Subretinal lipid globules are a newly recognized optical coherence tomography finding of macular exudation, which appear as small, round, hyporefective structures with a characteristic hypertransmission tail. In this retrospective cohort study, these lesions were frequently seen in eyes receiving intravitreal anti-vascular endothelial growth factor therapy for type 1 macular neovascularization due to age-related macular degeneration.

- 
- **126 Ophthalmic Emergency Department Visits: Factors Associated with Loss to Follow-up.** *Evan M. Chen, Aneesa Ahluwalia, Ravi Parikh, and Kristen Nwanyanwu*

This study examined the loss to follow-up (LTFU) rate of individuals presenting to emergency departments (EDs) in a single health system for eye-related conditions. Over one-quarter of patients recommended to follow-up were LTFU, and several patient characteristics were associated with a higher likelihood of LTFU. In addition, patients LTFU were significantly more likely to revisit the ED for the same condition. This study suggests that further research regarding follow-up adherence after eye-related ED visits is required.

- 
- **137 Anterior Segment OCTA of Melanocytic Lesions of the Conjunctiva and Iris.** *Niels J. Brouwer, Marina Marinkovic, Jaco C. Bleeker, Gregorius P.M. Luyten, and Martine J. Jager*

Angiogenesis may help to differentiate between benign and malignant melanocytic lesions and to characterize tumor behavior. In this study, OCT-angiography was

applied to melanocytic lesions of the conjunctiva and iris. In most cases, vessels could be depicted noninvasively, and vessel density was measured. Differentiation between benign and malignant lesions was not successful. Image quality was dependent on patient cooperation and tumor characteristics, such as location on the eye and tumor pigmentation.

- 
- **148 Immunohistochemical profiling of conjunctival melanocytic intraepithelial lesions, including SOX10, HMB45, Ki67, and P16.** *Tatyana Milman, Qiang Zhang, SuMae Ang, David Elder, Sara E. Lally, Jerry A. Shields, Rose A. Hamershock, Kareem Sioufi, Carol L. Shields, and Ralph C. Eagle, Jr*

This retrospective study of 47 conjunctival biopsies from 31 patients evaluated the usefulness of melan-A, SOX10, HMB45, and p16 immunohistochemical stains in the distinction between the low-grade and high-grade conjunctival melanocytic intraepithelial lesions. The study demonstrated that although the stains for melanocytic markers melan-A and SOX10 facilitate assessment of melanocytic intraepithelial lesions, the current immunohistochemical panels have limited value in distinction between the low-grade and high-grade intraepithelial melanocytic proliferations and need to be used judiciously.

- 
- **157 A Population-Based Study of Anterior Ischemic Optic Neuropathy Following Cataract Surgery.** *Sasha A. Mansukhani, John J. Chen, Aaron M. Fairbanks, Robert C. Foster, Jay C. Erie, Keith H. Baratz, David O. Hodge, and M. Tariq Bhatti*

This population-based, 27-year study found that the incidence of anterior ischemic optic neuropathy is higher in the year following cataract surgery when compared to spontaneous onset; however, there is no increased risk in the early postoperative period. This finding will be useful during discussions with the patient prior to proceeding

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with cataract surgery and adds to the understanding of the pathophysiology of the condition.

- 
- **166 Contralateral Surgery for the Treatment of Third Nerve Palsy with Aberrant Regeneration.** *Heba M. Fouad, Ahmed M. Kamal, Ahmed Awadein, and Monte A. Del Monte*

In a retrospective case series on patients with third nerve palsy and aberrant regeneration who had an eyelid ptosis that improves on adduction, contralateral recession of the lateral rectus muscle and resection of the medial rectus muscle was found to be helpful both in correcting the exotropia in the primary position and improving the eyelid ptosis by increasing the innervational impulses to the affected medial rectus and levator muscles.

- 
- **174 Incidence and Natural History of Retinochoroidal Neovascularization in Enhanced S-Cone Syndrome.** *Sawsan R. Nowilaty, Abrar K. Alsalamah, Moustafa S. Magliyah, Abdulelah A. Alabdullah, Khabir Ahmad, Valmore A. Semidey, Marco Mura, and Patrik Schatz*

We found a cumulative incidence of macular retinochoroidal neovascularization in enhanced S-cone syndrome of 15%. We describe the natural history of such lesions, which may be much more common than previously estimated.

- 
- **185 SCORE2 Report 13: Intraretinal Hemorrhage Changes in Eyes With Central or Hemiretinal Vein Occlusion Managed With Aflibercept, Bevacizumab or Observation. Secondary Analysis of the SCORE and SCORE2 Clinical Trials.** *Andrew Hendrick, Paul C. VanVeldhuisen, Ingrid U. Scott, Jacquie King, Barbara A. Blodi, Michael S. Ip, Rahul N. Khurana, and Neal L. Oden, for the SCORE2 Investigator Group*

This secondary analysis provides information on intraretinal macular hemorrhage changes in eyes with central retinal vein occlusion–or hemiretinal vein occlusion–

associated macular edema treated with antivascular endothelial growth factor injections or observation. The resolution of hemorrhages was associated with visual acuity improvement at month 6. Hemorrhage status at month 6 also independently predicted visual acuity changes at month 6 beyond what was explained by changes in central subfield thickness. These findings suggest that intraretinal macular hemorrhage is an important indicator of disease severity in retinal vein occlusion.

- 
- **194 The Impact of Physician Face Mask Use on Endophthalmitis After Intravitreal Anti-Vascular Endothelial Growth Factor Injections.** *Samir N. Patel, Jason Hsu, Meera D. Sivalingam, Allen Chiang, Richard S. Kaiser, Sonia Mehta, Carl H. Park, Carl D. Regillo, Arunan Sivalingam, James F. Vander, Allen C. Ho, and Sunir J. Garg, for the Wills Post-Injection Endophthalmitis (PIE) Study Group*

This study evaluated the rate of postinjection endophthalmitis with physician face mask use compared to a “no talking” policy without face mask use. In evaluation of 483,622 intravitreal injections, physician face mask use did not reduce the rate of postinjection endophthalmitis compared to a “no talking” policy. No cases of oral flora-associated endophthalmitis were identified with physician face mask use.

- 
- **202 Vitamin analysis comparison study.** *Efrat Fleissig, Eddie Apenbrinck, Xiang Zhang, and Charles C. Barr*

This study highlights the fact that both generic and branded Age-Related Eye Disease Study vitamins sold on the market are relatively accurate in their labeling and are safe to use. It is of importance to check the labeling of the vitamins prescribed to make sure they qualify with the Age-Related Eye Disease Study 2 recommendations.

- 
- **206 Novel Parameters to Assess the Severity of Corneal Neovascularization Using Anterior Segment Optical Coherence Tomography Angiography.** *William*

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*W. Binotti, N. Dilruba Koseoglu, Ricardo M. Nosé, Kenneth R. Kenyon, and Pedram Hamrah*

Anterior segment–optical coherence tomography angiography (AS-OCTA) can reliably provide quantitative, fast acquisition, and noninvasive parameters for the assessment severity in corneal neovascularization. On AS-OCTA, greater posterior limit, thickness, depth, area, and volume of the corneal neovascularization was seen in severe cases compared to mild. The corneal neovascular volume and corneal depth parameters strongly correlate to visual acuity at initial presentation.

• **218 Real-world Outcomes of DMEK: a Prospective Dutch Registry Study.** *Suryan L. Dunker, Manon H.J. Veldman, Bjorn Winkens, Frank J.H.M. van den Biggelaar, Rudy M.M.A. Nuijts, Pieter Jan Kruit, and Mor M. Dickman, on behalf of the Dutch Cornea Consortium*

This Dutch registry study of 752 consecutively performed Descemet membrane endothelial keratoplasty (DMEK) procedures showed that DMEK is an effective treatment for Fuchs' endothelial corneal dystrophy with respect to vision restoration, inducing a small hyperopic shift with an acceptable endothelial cell loss. Graft survival improved over time, suggesting a learning curve on a national level.

• **226 Early Detection of Microvascular Impairments With Optical Coherence Tomography Angiography in Diabetic Patients Without Clinical Retinopathy: A Meta-analysis.** *Bilei Zhang, Yuyu Chou, Xinyu Zhao, Jingyuan Yang, and Youxin Chen*

Retinal microvascular impairments, including foveal avascular zone enlargement and decrease of perfusion density of the macula and radial peripapillary capillary, might have occurred antecedent to clinically visible diabetic retinopathy and could be detected early by optical coherence tomography angiography. However, those

manifestations could be inconsistent according to the types of diabetes mellitus.

• **238 Rates of Glaucomatous Structural and Functional Change from a Large Clinical Population: The Duke Glaucoma Registry Study.** *Alessandro A. Jammal, Atalie C. Thompson, Eduardo B. Mariottoni, Carla N. Urata, Tais Estrela, Samuel I. Berchuck, Henry C. Tseng, Sanjay Asrani, and Felipe A. Medeiros*

This was a retrospective cohort study in which rates of structural and functional change in glaucoma and glaucoma suspects were estimated using a large database of electronic medical records. Optical coherence tomography showed an important role in detecting fast progressors, even in eyes with advanced glaucoma.

• **248 Validity and Reliability of Semiautomatic Ocular Cycloposition Measurement with Spectralis Optical Coherence Tomography.** *Elena Piedrahita-Alonso, Alicia Valverde-Megias, and Rosario Gomez-de-Liano*

Disc-fovea angle quantification in fundus photography is considered the gold standard for cycloposition assessment. Spectral domain optical coherence tomography also measures the disc-fovea angle based on subject fixation and improves the clinical performance of the cycloposition evaluation. In the present study, the OCT method had good agreement with the gold standard and better precision. Its repeatability and reproducibility were excellent and unconditioned by foveal status.

• **256 Geometric Perfusion Deficits: A Novel OCT Angiography Biomarker for Diabetic Retinopathy Based on Oxygen Diffusion.** *Siyu Chen, Eric M. Moulton, Linda M. Zangwill, Robert N. Weinreb, and James G. Fujimoto*

Geometric perfusion deficit is an optical coherence tomography angiography metric that can quantify macular

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microvascular remodeling with interpretable physiological underpinning. It can differentiate eyes with diabetic retinopathy and has superior test-retest repeatability and improved statistical performance compared to vessel density percentage.

- 
- **271 Incidence of Management Changes at the Postoperative Day One Visit After Pars Plana Vitrectomy for Retinal Detachment.** *Dillan Patel, Durga S. Borkar, Malika Madhava, Anthony Obeid, Phoebe L. Mellen, Carl D. Regillo, and Sunir J. Garg, on behalf of the Wills Eye Retinal Detachment Study Group*

In this study of uncomplicated pars plana vitrectomy for retinal detachment, all management changes within the first day postoperatively were related to elevated intraocular pressure. This suggests that it may be possible to streamline the postoperative visit schedule in some cases by considering intraocular pressure checks with an ophthalmic technician or non-retina specialist.

- 
- **285 Sex Differences in Academic Rank, Scholarly Productivity, National Institutes of Health Funding, and Industry Ties Among Academic Cornea Specialists in the United States.** *Mckenzee Chiam, Mona L. Camacci, Erik B. Lehman, Michael C. Chen, Gargi K. Vora, and Seth M. Pantanelli*

This study investigated whether disparities exist in academic rank, scholarly productivity, National Institutes of Health funding, and industry partnerships between sexes. The results of this study show that sex differences in academic ranks and productivity are likely related to a smaller proportion of female cornea specialists who are advanced in their careers currently. As more females pursue cornea and advance in their careers, inequities seen between sexes will likely attenuate.

- 
- **292 Fibrillar Layer as a Marker for Areas of Pronounced Corneal Endothelial Cell Loss in Advanced Fuchs Endothelial Corneal Dystrophy.** *Agathe Hribek, Thomas Clahsen, Jens Horstmann, Sebastian Siebelmann, Niklas Loreck, Ludwig M. Heindl, Björn O. Bachmann, Claus Cursiefen, and Mario Matthaei*

This prospective case series characterizes corneal endothelial cell density in correlation to changes of collagen composition of Descemet membrane in patients with advanced Fuchs endothelial corneal dystrophy. It shows that a fibrillar layer with a clear geographic pattern marks areas of pronounced loss of corneal endothelial cell density in advanced Fuchs endothelial corneal dystrophy eyes and may be imaged by slit-lamp biomicroscopy *in vivo*.

- 
- **302 Relationship Between Choriocapillaris Flow and Scotopic Microperimetry in Early and Intermediate Age-Related Macular Degeneration.** *Marco Nassisi, Tudor Tepelus, Giulia Corradetti, and Srinivas R. Sadda*

The severity of choriocapillaris impairment in the macula of eyes with early or intermediate age-related macular degeneration (AMD) correlates with scotopic retinal sensitivity with a correlation coefficient as high as 0.635. This observation highlights the potential value of choriocapillaris flow deficit measurement as an early biomarker in eyes with AMD.

- 
- **310 The Impact of Race on Short-term Treatment Response to Bevacizumab in Diabetic Macular Edema.** *Pawarissara Osathanugrah, Nayan Sanjiv, Nicole H. Siegel, Steven Ness, Xuejing Chen, and Manju L. Subramanian*

This retrospective study investigates the short-term impact of race on the outcome of intravitreal bevacizumab treatment for diabetic macular edema. In 314 patients receiving a single injection and 151 patients receiving 3 injections, black patients had a significantly lower likelihood of visual

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acuity improvement compared with white and Hispanic patients. No significant differences in central macular thickness change were found.

- 
- **318 Phenotype and Outcomes of Phakic Versus Pseudophakic Primary Rhegmatogenous Retinal Detachments: Cataract or Cataract Surgery Related?** *Mariantonia Ferrara, Alex Mehta, Hamza Qureshi, Peter Avery, David Yorston, D. Alistair Laidlaw, Tom H. Williamson, and David H.W. Steel, on behalf of the BEAVRS Retinal Detachment Outcomes Group*

This study compared the epidemiologic and clinical features, surgical management, and outcomes of over 4,000 pseudophakic vs phakic retinal detachments, as well as within the phakic eyes, for cases with and without cataract. Pseudophakic and phakic retinal detachments differed significantly in terms of their age, sex, fellow-eye history, and clinical features. By distinction, pseudophakic retinal detachment and retinal detachment with cataract shared several clinical similarities.

- 
- **328 Aqueous Cytokine Expression and Higher-Order OCT Biomarkers: Assessment of the Anatomic-Biologic Bridge in the IMAGINE DME Study.** *Joseph R. Abraham, Charles C. Wykoff, Sruthi Arepalli, Leina Lunasco, Hannah J. Yu, Ming Hu, Jamie Reese, Sunil.K. Srivastava, David M. Brown, and Justis P. Ehlers*

This study evaluated the prognostic potential of aqueous humor cytokines for predicting anatomic response to intravitreal ranibizumab in patients with diabetic macular edema and also evaluated the anatomic-biologic bridge through correlation of optical coherence tomography imaging biomarkers with cytokine concentrations. The results indicated that vascular endothelial growth factor and monocyte chemoattractant protein-1 pretreatment concentrations differed between eyes likely to experience anatomic response to ranibizumab. Further investigations into intraocular cytokine dynamics may engender effective

personalized treatment regimens and prognoses for eyes with diabetic macular edema.

- 
- **340 Quantitative Fundus Autofluorescence in ABCA4-related retinopathy – Functional Relevance and Genotype-Phenotype Correlation.** *Philipp L. Müller, Martin Gliem, Myra McGuinness, Johannes Birtel, Frank G. Holz, and Peter Charbel Issa*

This study demonstrates that elevated quantitative fundus autofluorescence measures depend on the ABCA4-variants, precede other structural changes and may remain without functional effect. It provides an additional diagnostic dimension and may be a useful outcome measure.

- 
- **351 Incidence and Reasons for Intrastromal Corneal Ring Segment Explantation.** *Francesco D’Oria, Ahmed A. Abdelghany, Natalia Ledo, Rafael I. Barraquer, and Jorge L. Alio*

A retrospective analysis of 121 ICRSs explanted over a 10-year period revealed that the main reason for ICRS removal was functional failure, mainly refractive failure (39.67%)—defined as the worsening in visual acuity or subjective optical symptoms after the initial improvement, which frequently happened in mild cases of keratoconus, followed by natural extrusion of the ring (29.75%), which happened more often in advanced cases of the disease. The overall explantation rate was 5.6%.

- 
- **359 Comparison of Nd:YAG Laser Capsulotomy Rates between Refractive Segmented Multifocal and Multifocal Toric Intraocular Lenses.** *Jung Wan Kim, Youngsub Eom, Eun Gyu Yoon, Young Choi, Jong Suk Song, Ji Won Jeong, Seh Kwang Park, and Hyo Myung Kim*
- Patients with refractive multifocal toric IOLs presented a higher incidence of Nd:YAG laser capsulotomy when compared with those with refractive multifocal nontoric IOLs. On the other hand, femtosecond laser CCC could not reduce the incidence of Nd:YAG laser capsulotomy



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when compared with outcomes of conventional CCC in this study.

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• **368 Emergent Ophthalmic Surgical Care at a Tertiary Referral Center during the COVID-19 Pandemic.**

*Hasenin Al-khersan, Meghana A. Kalavar, Rebecca Tanenbaum, Thomas A. Lazzarini, Nimesh A. Patel, Nicolas A. Yannuzzi, Jayanth Sridhar, Justin H. Townsend, Audina M. Berrocal, and Zubair A. Ansari*

The present study reviews the volume and type of emergent surgical cases performed at a tertiary ophthalmic center at the height of the COVID-19 pandemic shutdown compared with the previous year. The review found that the volume during the shutdown was 10% that of the previous year. The report also highlights COVID-19 testing protocols and protective measures. As the pandemic continues, these experiences may offer useful insights to ophthalmic surgeons.

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• **373 Internet Search Engine Queries of Common Causes of Blindness and Low Vision in the United States.** *Grant L. Hom, Andrew X. Chen, Tyler E. Greenlee, and Rishi P. Singh*

The search results of this retrospective cross-sectional study on American Internet users yield information on disease basics or treatment education for common causes of blindness and low vision. Searches related to cataract most commonly yielded education information on cataract treatment whereas searches on other conditions studied such as glaucoma and diabetic retinopathy most commonly yielded education information on disease basics. The study's results may inform future patient education practices.

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• **382 Randomized, double-masked trial of netarsudil 0.02% ophthalmic solution for prevention of corticosteroid-induced ocular hypertension.** *Marianne O. Price, Matthew T. Feng, and Francis W. Price, Jr*

Prophylactic use of netarsudil 0.02% ophthalmic solution did not significantly reduce the risk of corticosteroid-associated intraocular pressure elevation relative to use of placebo, nor did it significantly affect the re-bubble rate or central endothelial cell loss following Descemet membrane endothelial keratoplasty. The results do not support off-label prophylactic use of netarsudil to prevent post-keratoplasty steroid-induced ocular hypertension.

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• **388 Subretinal Mononuclear Cells in Coats' Disease Studied with RPE65 and CD163: Evidence for Histiocytoid Pigment Epithelial Cells.** *Frederick A. Jakobiec, Paula Cortes Barrantes, Yoshihiro Yonekawa, Eleonora M. Lad, and Alan D. Proia*

The identity of mononuclear cells in the subretinal exudate of Coats' disease was investigated using immunohistochemistry with antibodies to RPE65 for retinal pigment epithelium and CD163 for histiocytes. Some of the subretinal cells coexpressed RPE65 and CD163, indicating differentiation of RPE cells toward histiocytes. The presence of histiocytoid pigment epithelium at the level of Bruch membrane probably also has implications for macular degeneration.

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## CORRESPONDENCE

- 
- **397 Comment on: Crossover to photodynamic therapy or micropulse laser after failure of primary treatment of chronic central serous chorioretinopathy.** *Lihteh Wu and José A. Roca* • **397 Reply to Comment on: Crossover to Photodynamic Therapy or Micropulse Laser After Failure of Primary Treatment of Chronic Central Serous Chorioretinopathy.** *Thomas J. van Rijssen, Elon H.C. van Dijk, Greet Dijkman, Roula Tsonaka, Paula Scholz, Myrte B. Breukink, Carel B. Hoyng, Petrus J.H. Peters, Robert E. MacLaren, Susan M. Downes, Sascha Fauser, and Camiel*

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