TWO PROMINENT OPHTHALMOLOGISTS FROM CINCINNATI

BY ***Taylor Asbury MD*** AND ***James J. Augsburger MD***

Purpose: To discuss two of the most important and influential ophthalmologists of their eras, both of whom achieved prominence in Cincinnati and were distinguished members of the AOS.

Methods: Historical review.

Results: Dr. Elkanah Williams (1822-1888) was born in Indiana and attended Asbury College (Indiana) and the University of Louisville School of Medicine. He was one of the first physicians in the United States to limit his practice to ophthalmology and among the first to use an ophthalmoscope (1855). He became Chairman of Ophthalmology at the Miami Medical College in Cincinnati in 1865 and held this position until shortly before his death. He was an original member of the AOS (1864). Dr. Derrick T. Vail, Jr. (1878-1973) grew up in Cincinnati and attended Yale University and Harvard Medical School. After ophthalmology residency at the Massachusetts Eye and Ear Infirmary, he traveled to India to perform cataract surgery with Colonel Henry Smith. He became Chairman of Ophthalmology at the University of Cincinnati in 1937. During World War II, he served as Senior Eye Consultant for all American Armed Forces in Europe. After the war, Dr. Vail accepted the position of Chairman of Ophthalmology at Northwestern University. He achieved great national recognition as long-term editor of the American Journal of Ophthalmology (1940-1965). He was a leading member of the AOS (1948-1977) and served as its president in 1959.

Conclusion: Drs. Williams and Vail were giants of ophthalmology of different eras who had lasting impacts on the specialty and the AOS.

LOCALIZED CHOROIDAL MELANOCYTOSIS: A DISTINCT CLINICAL ENTITY?

BY ***James J. Augsburger MD***, *Vrinda Hershberger MD,* AND *JoAnn Chang MD*

Purpose: To describe what appears to be a distinct clinical entity, localized choroidal melanocytosis (a limited form of congenital ocular melanocytosis), in a series of patients encountered in a single referral practice.

Methods: Retrospective descriptive analysis of seven patients with a localized choroidal patch of confluent but flat melanotic hyperpigmentation measuring at least 5 mm in maximal basal diameter.

Results: The seven patients ranged in age at initial diagnosis from 2 months to 83 years (median 17 years). Two of the patients were male and five were female. All patients were asymptomatic, and all lesions were detected on dilated fundus examination prompted by other issues. None of the lesions had measurable thickness by ultrasonography. The melanotic choroidal patch ranged from 7.5 mm to 23 mm in maximal arc length basal diameter (median maximal basal diameter 14.5 mm). It was located entirely posterior to the equator in five patients and straddled the equator in two. It extended beneath the fovea in four patients and to the optic disc margin in two. None of these lesions that have been followed for more than six months have enlarged appreciably.

Conclusions: Localized choroidal melanocytosis appears to be a distinct clinical entity that probably represents a limited form of congenital ocular melanocytosis. This fundus lesion must be distinguished from choroidal nevus, choroidal melanoma, and other darkly pigmented fundus tumors. Patients with this form of ocular melanocytosis may have an increased risk of developing uveal melanoma from the hypermelanotic choroidal patch.

Bold type indicates AOS member.

NEW TREATMENT OPTIONS FOR MANAGING ENDOGENOUS FUNGAL ENDOPHTHALMITIS USING VORICONAZOLE AND CASPOFUNGIN

BY ***M. Gilbert Grand MD***, *Seenu M. Hariprasad MD*, ***William F. Mieler MD***, *Gaurav K. Shah MD*, *Sean Breit MD*, AND *Russell Van Gelder MD*

Purpose: Voriconazole, a new generation triazole, has been shown to achieve therapeutic intraocular levels after oral administration. Caspofungin is the first approved agent from a new class of antifungals, the echinocandins. This series describes the experience at two centers in using these novel antifungals to treat endogenous fungal endophthalmitis.

Methods: A retrospective review of four patients with Candida endophthalmitis from the Barnes Retina Institute and the Cullen Eye Institute. Post-mortem intraocular voriconazole concentrations on a fifth patient will be presented as well.

Results: All patients had systemic cultures positive for Candida species. Our first two patients had prompt resolution of intraocular mycosis with systemic voriconazole and caspofungin. The third patient received 100mcg of intravitreal voriconazole (final vitreous concentration 25 mcg/ml) followed by oral voriconazole and responded favorably. Our fourth patient with bilateral disease responded well to intravenous voriconazole and caspofungin but had a recurrence after being discharged on oral voriconazole and IV caspofungin. This patient had a bowel resection with an ileostomy; therefore, absorption of oral voriconazole may have been inadequate. Bilateral amphotericin-B intravitreal injection ultimately resolved this infection. Our fifth patient had multi-system failure and passed away one week after initiating intravenous voriconazole for candidemia. Post-mortem HPLC analysis of the aqueous and vitreous revealed voriconazole concentrations of 1.52 mcg/ml and 1.12 mcg/ml, respectively (MIC_{90} of C. albicans is 0.06 mcg/ml).

Conclusions: Voriconazole and caspofungin appear to be powerful weapons to add to our existing armamentarium against fungal endophthalmitis. Further studies are warranted to precisely define the role of these new agents.

THE DRAGGED-FOVEA DIPLOPIA SYNDROME

BY ***David L. Guyton MD***, *M. Elaine De Pool MD*, AND *Sheena O. Broome* OC(C) COMT

Purpose: To identify the clinical characteristics of the "dragged-fovea diplopia (DFD) syndrome," to introduce a simple diagnostic test to identify this syndrome, and to provide a simple treatment option to provide relief from the diplopia in some of these cases.

Methods: We reviewed the records of our patients with a diagnosis of maculopathy, internal limiting membrane contracture, or "dragged fovea," and complaint of diplopia.

Results: Fifty-two affected eyes in 47 patients met the criteria for inclusion in the study. In 32 patients, the small-field central fusion test (viewing a single white letter on the black background of a distance visual acuity display) showed central fusion with the room lights off, but showed peripheral fusion with central diplopia with the room lights on. Diplopia recurred despite prism trial, as the patient adapted to the prism power in seconds to minutes. In 15 eyes, a pars plana vitrectomy with membrane peeling had been performed. In 6 of these patients, the diplopia was noticed only after the pars plana vitrectomy with membrane peeling. In 17 of the 32 patients, diplopia was effectively relieved using a piece of Scotch™ "Satin" tape.

Conclusions: The dragged-fovea diplopia syndrome consists of central diplopia in the presence of peripheral fusion that does not respond to prism therapy or eye muscle surgery. The small-field central fusion test ("lights on/off test") can be used to confirm the diagnosis in patients with clinical characteristics compatible with the DFD syndrome. A strip of Scotch "Satin" tape, applied vertically on the rear surface of the spectacle lens of the non-preferred eye, provides an aesthetic form of monocular occlusion. Epiretinal membrane peeling surgery can unmask or precipitate the development of the DFD syndrome.

Bold type indicates AOS member.

CORRELATION OF THE SUBJECTIVE AND OBJECTIVE RETINAL ARTERY PULSE: POSSIBLE HOME MONITORING OF OCULAR PERFUSION

BY ***James S. Kelley MD***

Purpose: To compare subjective patient response to ophthalmodynamometry (ODM) with objective observer's endpoint.

Methods: Patients were positioned at the slit lamp. Using a standard ODM device on the upper lid, pressure was raised until patients noted the "blinking" of the arterial pulse. Entopically, this was compared with observed onset of pulsation seen with a 60-diopter lens. Testing included 120 eyes of 75 patients.

Results: The subjective pulsation correlated exactly with the objective pulsation, when observed. In 10 percent of cases, there was no clear subjective pulse. Pulses in the choroids were visible to the observer but not to the patient.

Conclusions: Many patients could monitor their own diastolic ophthalmic artery pressures at home using a device similar to the Proview Pressure Monitor. Alternatively, a technician or non-ophthalmologist could estimate the perfusion pressure in the eye noting the patient's entopic pulsating endpoint.

DOES A 2.6 MM INCISION CAUSE LESS SURGICALLY-INDUCED ASTIGMATISM (SIA) THAN 3.0 TO 4.0 MM INCISIONS?

BY ***John C. Merriam MD,*** *Joanna E. Merriam,* AND *Lei Zheng*

Purpose: To compare surgically induced astigmatism (SIA) following a temporal 2.6 mm corneal incision to SIA following 3.0 to 4.0 mm incisions.

Methods: This retrospective study compares the effect on corneal curvature of inserting three-piece IOLs [Acrysof MA60AC (n = 81), Acrysof MA30BA (n = 172), AMO SI40 (n = 103)] with a lens forceps and 3 to 4 mm incisions with the injection of a one-piece acrylic IOL (Acrysof SA60AT, n = 125) via a 2.6 mm incision. Unoperated eyes (n=134) from these surgical groups served as controls. Corneal curvature was measured with a keratometer. We compared groups by calculating SIA with vector analysis, and by comparing absolute change on the horizontal and vertical meridians of each group. All groups were followed for at least 18 months.

Results: A linear equation (y = a + bx) describes change in SIA and the corneal meridians. Best-fit parameters and the 95 percent confidence intervals were calculated for each IOL type and control eyes. Surgical groups did not differ significantly from each other or control eyes.

Conclusions: As measured by keratometry, all these incisions appear to be astigmatically neutral. The clinician may prefer the smallest possible incision to maintain a stable chamber and to hasten recovery, but there is no detectable advantage of a sub-3.0 mm incision on SIA.

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SUPRANORMAL MULTIFOCAL ELECTRORETINOGRAMS (MFERGS) FOLLOWING ACUTELY ELEVATED INTRAOCULAR PRESSURE (IOP) IN MONKEYS AND IN VARIOUS HUMAN RETINAL DISORDERS

BY ***T. Michael Nork MD,*** *Charlene B. Y. Kim,* ***Paul L. Kaufman MD,*** AND *James N. Ver Hoeve*

Purpose: To describe a phenomenon of increased mfERG waveforms that is associated with a variety of pathologic conditions.

Methods: Three rhesus monkeys underwent cannulation of the anterior chamber followed by elevation of the intraocular pressures to 50 mmHg for up to five hours. One of the animals had a unilateral optic nerve transection (ONT). The stimulus consisted of an array of 241 equal-sized hexagonal elements. We also retrospectively reviewed our database of human patients and found four with markedly supranormal traces. Their diagnoses (ages) were as follows: multiple evanescent white dot syndrome (29), acute idiopathic blind spot enlargement (40), acute zonal occult outer retinopathy (30), and chloroquine retinopathy (42). A stretched, 103-element stimulus array was used for all of the patients. Their responses were compared quantitatively with 20 adult control subjects.

Results: K1 response amplitudes and oscillatory potentials increased rapidly and markedly in all three of the monkeys after IOP elevation. The central retina appeared to be more affected than the mid-periphery. Response amplitudes returned towards baseline levels within four weeks after the IOP returned to normal. The human patients all had supranormal early K1 waveforms that were ≥3 standard deviations above normal. In most cases, the waveforms decreased either to normal or below normal within a few months.

Conclusions: Retinal disease most often results in depression of the mfERG. However, given the right circumstances, the retina is capable of generating supranormal responses. Even so, these supranormal traces are associated with significant retinal pathology and may be an indicator of impending, irreversible damage.

PATHOLOGY IN EYES WITH ANTERIOR STROMAL DYSTROPHIES UNDERGOING EXCIMER LASER PHOTOTHERAPEUTIC KERATECTOMY

BY ***Christopher J. Rapuano MD***

Purpose: To evaluate the use of high frequency ultrasound biomicroscopy (UBM) in determining the depth of corneal pathology in eyes undergoing excimer laser phototherapeutic keratectomy (PTK) for primary or recurrent anterior stromal corneal dystrophies.

Methods: Twenty eyes of 14 patients with anterior stromal corneal dystrophies were treated with PTK. Eyes were evaluated pre- and six to eight weeks post-operatively with slit lamp biomicroscopy, manifest refraction, keratometry, computerized corneal topography, ultrasound pachymetry, and UBM.

Results: Nineteen of 20 corneas (95 percent) had greatly improved corneal clarity after PTK. Mean uncorrected Snellen vision improved from 20/102 to 20/69, and best-corrected vision improved from 20/62 to 20/38. Nine eyes (45 percent) improved two or more lines of uncorrected vision, and 13 eyes (65 percent) improved two or more lines of best-corrected vision. Mean change in spherical equivalent was just -0.92 diopters (SD: 4.3 diopters), although the range was large (-13 to +3.88 diopters). UBM measurement of central corneal pathology did not correlate significantly with the actual PTK ablation depth (P=0.07).

Conclusions: PTK resulted in improvements in corneal clarity and visual acuity in most patients with superficial corneal stromal dystrophies. UBM was not an effective tool to accurately measure the depth of corneal pathology pre-operatively. PTK is a very good minimally invasive technique to improve vision in eyes with anterior stromal corneal dystrophies.

Bold type indicates AOS member.

RECURRENT NANOLITER PUSH-PULL PERFUSION SAMPLING OF THE RAT VITREORETINAL INTERFACE

BY *Scott A. Shippy PhD,* ***Jose S. Pulido MS MD***, AND *Sumith Kottegoda*

Purpose: We describe the use of a nanoliter push-pull perfusion system for the recurrent sampling of amino acids at the vitreoretinal interface.

Methods: Amino acid levels from 10 animals were quantified in samples collected by low-flow push-pull perfusion. The low-flow push-pull perfusion probe is constructed of concentric fused silica capillaries (outer diameter 170-micron) and fits through a 29-gauge needle for insertion into the vitreous. After visual verification of placement at the vitreoretinal interface with indirect ophthalmoscopy, saline is perfused through the capillary probe construction at 20-50 nL/min flow rates. Samples are collected every 10-15 minutes for three hours and the amino acid content of 500-nL samples is found via a capillary electrophoresis separation.

Results: The basal levels at the vitreoretinal interface are determined for 11 amino acids. The amino acids quantified include major neurotransmitters including glutamate, glycine, GABA, and D-Ser. The basal levels have similar proportions as found in plasma but are lower than levels reported following more invasive vitreous collection methods. The probe construction is significantly small so that no damage is seen to the eye. Further, the small perfusion region allows spatially targeted and recurrent sampling of the vitreoretinal interface.

Conclusions: These results demonstrate a new method for determining chemical composition of the rat vitreoretinal interface. The basal levels of major neurotransmitter amino acids are determined. Profiling the chemical composition of the vitreoretinal interface in normal and disease states may elucidate potential treatment targets and advance an understanding of disease progression.

Bold type indicates AOS member.