

Journal Highlights

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

Ophthalmology

Translating Amblyopia Research Findings to the Clinical Setting

Ophthalmology

Published online Feb. 6, 2013

Jin et al. examined whether Pediatric Eye Disease Investigator Group (PEDIG) recommendations for amblyopia patching regimens had been put into clinical practice in a large North American urban center. Although they acknowledged a general move from full-time to part-time patching since the PEDIG results were published, the authors' study showed that only 24 percent of patients with moderate amblyopia were prescribed the recommended two hours of daily patching, and only 12 percent with severe amblyopia were prescribed the recommended six hours of daily patching.

This retrospective cohort study involved 71 children with moderate amblyopia (defined as visual acuity between 20/40 and 20/80) and 52 children with severe amblyopia (defined as visual acuity between 20/100 and 20/400). The authors recorded the number of prescribed patching hours per day of the sound eye and the visual acuity of the amblyopic eye.



The authors found that the children with moderate amblyopia were prescribed a mean of 3.2 hours of daily patching, which is significantly greater than the PEDIG-recommended two hours of daily patching for initial treatment. Mean visual acuity in the amblyopic eye at three- to six-month follow-up was comparable to the visual acuity in a similar group of children recorded at a four-month follow-up in the PEDIG Amblyopia Treatment Studies.

The authors also found that children with severe amblyopia were prescribed a mean of 3.9 hours of daily patching, which is significantly lower than the PEDIG-recommended six hours of daily patching. Mean visual acuity in this cohort's amblyopic eye at three- to six-month follow-up was worse than the visual acuity recorded at four-month follow-up in a similar cohort of the PEDIG

study. At the seven- to 12-month visit, however, the authors found that mean visual acuity in eyes with severe amblyopia was comparable to that of the PEDIG cohort at four-month follow-up.

The authors recommended prompt implementation of the Knowledge-to-Action Cycle framework to help translate evidence-based knowledge to clinical practice.

Multicolor Flow Cytometric Immunophenotyping to Diagnose Intraocular Lymphoma

Ophthalmology

Published online Feb. 4, 2013

Intraocular lymphoma is a rare condition that can be difficult to distinguish from uveitis or other diseases that mimic uveitis. Missotten et al. evaluated multicolor flow cytometric immunophenotyping to determine if this diagnostic approach could quickly and accurately detect intraocular lymphoma. Their results showed that this technology, which is currently available in most immunologic or hematologic laboratory facilities, proved to be a useful tool in patients suspected of having the disease.

The investigators analyzed 59 consecutive vitreous samples from 51 patients presenting with pseudo-uveitis that was clinically suspected to be an intraocular lymphoma. They performed multicolor flow cytometric immunophenotyping with CD45, CD3, CD19, CD20, anti-SmIgκ, and anti-SmIgλ antibodies. Diagnosis of non-Hodgkin lymphoma was confirmed by the presence of a clear B-cell population with a disequilibrium of Igκ versus Igλ expression.

The authors found that the multicolor flow cytometric analysis possessed 82.4 percent sensitivity and 100 percent specificity in patients with suspected intraocular lymphoma. Because

results were available on the same day as the vitreous biopsy, the authors concluded that this type of testing provides a fast determination of further therapy in patients with a clinical suspicion of the disease.

Effect of Day Length on Eye Elongation and Myopia Progression in Children

Ophthalmology

Published online Feb. 4, 2013

Cui et al. found that myopia progression and axial elongation rates in myopic children fluctuate over the year in conjunction with day length. More specifically, axial eye growth and myopia progression decreased with increasing daylight hours, supporting previous epidemiologic results that demonstrated a protective role of outdoor light on the development of myopia.

This cross-sectional study involved 235 children aged 8 to 14 years with myopia who were screened for myopia progression, axial eye growth, and changes in corneal curvature over a period of six months. The investigators used an astronomical table to calculate a value for the hours of daylight accumulated by each patient during the six months. Participants were then divided into seven groups (A through G) according to the accumulated hours, ranging from group A at 1,660 to 1,739 hours to group G at 2,755 to 2,804 hours.

The investigators found significant correlations between hours of daylight and eye elongation, myopia progression, and corneal power change. In children with an average of 2,782 hours of daylight, axial eye growth was 0.12 mm, myopia progression was 0.26 D, and corneal power change was 0.05 D. By contrast, children with an average of 1,681 hours of daylight had axial eye growth of 0.19 mm, myopia progression of 0.32 D, and corneal power change of -0.04 D.

The authors concluded that children should be encouraged to spend more time outside during the daytime to prevent myopia.

American Journal of Ophthalmology

PROSE Therapy in Patients With Corneal Epithelial Defects

April *AJO*

Ling et al. reviewed the efficacy of the Prosthetic Replacement of the Ocular Surface Ecosystem (PROSE) for treating recurrent or persistent corneal epithelial defects. They found that the therapy—whether continuous or daily wear—was indeed effective in treating these defects and that ongoing wear may be required to prevent recurrence.

In this case series, the investigators reviewed the medical records of nine patients with a history of recurrent or persistent corneal epithelial defects refractory to conventional treatment. The investigators also identified defect recurrence after cessation of PROSE and any other complications. This study cohort included four cases of neurotrophic keratopathy, one case of Stevens-Johnson syndrome, two cases of stromal dystrophies, and two cases of chemical/thermal injury.

All patients were initially treated with extended-wear silicone hydrogel contact lenses; however, wearing these lenses was not effective in healing or preventing recurrence of corneal epithelial defects. Defects healed without recurrence in all nine patients when treated with continuous or daily PROSE wear. Eight patients developed recurrent defects when PROSE was discontinued, but the defects healed after PROSE wear resumed. Visual acuity improved in eight PROSE patients.

Diffusion of Technologies for Exudative AMD

April *AJO*

Using longitudinal data from Medicare claims, Stein et al. determined the diffusion of diagnostic tests and therapeutic interventions in the United States through 2009 for patients with newly diagnosed age-related macular degeneration (AMD). They found that newer, more effective therapeutic interventions for

AMD diffused rapidly throughout the United States, quickly replacing older, less effective interventions.

This cohort analysis included a total of 23,941 Medicare beneficiaries with exudative AMD diagnosed between 1992 and 2009. The authors reviewed CPT billing codes to identify the use of diagnostic tests (optical coherence tomography, fluorescein angiography, and fundus photography) and therapeutic interventions (argon laser photocoagulation, photodynamic therapy, intravitreal corticosteroids, and anti-VEGF agents) during the first year following diagnosis.

Diffusion was rapid for each new diagnostic and treatment modality, with use of newer procedures quickly replacing existing ones. The number of beneficiaries treated with anti-VEGF agents, for example, grew to be considerably greater than those treated with prior innovations such as argon laser photocoagulation and photodynamic therapy, rising from 4 percent of beneficiaries in 2004 to 62.7 percent in 2009. The authors also found that use of bevacizumab substantially exceeded that of ranibizumab from 2006 through 2009. Rates of diffusion for all therapies were relatively similar in communities irrespective of the presence of a major teaching hospital in the vicinity.

Ultrasound Biomicroscopy of the Ciliary Body in Ocular Tumors

April *AJO*

Velazquez-Martin et al. described the ultrasound biomicroscopy (UBM) findings of the ciliary body in patients with ocular/oculodermal melanocytosis. The authors found that ciliary body involvement presents as increased thickness and higher ultrasound reflectivity on UBM compared with the unaffected eye.

Twelve patients with ocular/oculodermal melanocytosis underwent UBM examination. The authors obtained radial images of the ciliary body from both the affected eye and the contralateral unaffected eye. UBM study characteristics included ciliary body thickness and reflectivity.

All patients showed unilateral diffuse pigmentation involving the episclera and anterior chamber angle. Eleven patients presented with fundus heterochromia, and one patient showed normal fundus pigmentation in both eyes. The iris displayed diffuse pigmentation in 10 patients and monocular sectorial iris heterochromia in two. Mean ciliary body thickness of the affected eyes was 0.581 mm compared with 0.475 mm in the control eyes—a statistically significant difference. The affected ciliary bodies also displayed hyperreflectivity compared with those of the control eyes.

JAMA Ophthalmology

Clinical Manifestations of CMV-Associated Uveitis in HIV-Negative Patients

March *JAMA Ophthalmology*

Pathanapitoon et al. investigated the clinical manifestations and comorbidity of HIV-negative patients with cytomegalovirus (CMV)-associated posterior uveitis and panuveitis. The authors found that CMV-associated infections of the posterior segment can develop in HIV-negative patients with compromised immune functions; however, these infections may also occur in individuals with no evidence of immune insufficiency. They also noted that CMV-associated infections in HIV-negative patients have more variable clinical manifestations and present with inflammatory signs that are distinct from classic CMV retinitis observed in HIV-positive patients.

The authors reviewed the medical records of 18 patients (22 eyes) diagnosed with CMV-associated posterior uveitis or panuveitis and registered clinical manifestations and associated systemic diseases. Ocular manifestations included focal hemorrhagic retinitis and acute retinal necrosis. Anterior segment inflammation and retinal vasculitis developed in 64 percent and 81 percent of eyes, respectively.

Eleven patients were on immunosuppressive medications (five patients

for hematologic malignant diseases, four for systemic autoimmune diseases, and two following organ transplantations). One additional patient was diagnosed with non-Hodgkin lymphoma three months after onset of CMV panuveitis, and another patient had primary immunodeficiency disorder. Of the remaining five patients, two had diabetes, and three patients had no associated systemic diseases and exhibited no evidence of immune deficiency on long-term follow-up.

Association Between Depression and Functional Vision Loss

March *JAMA Ophthalmology*

Zhang et al. estimated the prevalence of depression in individuals with normal vision and those with vision loss among U.S. adults aged 20 years and older. The authors found that self-reported loss of visual function is associated with depression. However, they found no evidence that loss of visual acuity is associated with the condition.

The authors examined data from 10,480 participants in the National Health and Nutrition Examination Survey to extrapolate the prevalence of depression experienced by the U.S. population. They assessed depression and visual function using self-reported questionnaires and measured visual acuity based on clinical examination.

From 2005 to 2008, the estimated prevalence of depression was 11.3 percent among U.S. adults with self-reported loss of visual function and 4.8 percent among adults without loss of visual function. The estimated prevalence of depression was 10.7 percent among adults with visual acuity impairment (visual acuity worse than 20/40 in the better-seeing eye) compared with 6.8 percent among adults with normal visual acuity. After controlling for age, sex, race/ethnicity, marital status, education, income, employment status, and general health status, self-reported loss of visual function remained significantly associated with depression, whereas the association between presenting visual

acuity impairment and depression was no longer statistically significant.

In Vivo Confocal Microscopy of Fuchs Endothelial Dystrophy Before and After Endothelial Keratoplasty

March *JAMA Ophthalmology*

Using in vivo confocal microscopy, Patel and McLaren examined corneas with Fuchs endothelial dystrophy to determine if abnormalities of corneal stromal and subepithelial cells resolve three years after Descemet stripping endothelial keratoplasty (DSEK). The authors found that the anterior cornea in patients with this degenerative disease is abnormal, even if these corneas appear clear by slit-lamp examination. They also noted that reduced cellularity of the anterior stroma does not recover after restoration of endothelial function.

In this study, 42 patients (49 eyes) received endothelial keratoplasty for Fuchs dystrophy. None of the corneas were vascularized or had subepithelial fibrosis prior to surgery. In vivo confocal microscopy was used to determine qualitative and quantitative changes in the corneas, especially anterior corneal changes in stromal cells and abnormal subepithelial cells.

Anterior stromal cell density was decreased in Fuchs dystrophy before DSEK and remained decreased three years after the procedure. The authors also found that networks of subepithelial cells were present three years after surgery and were evident in 67 percent of all eyes. Abnormal cellularity in the anterior cornea was associated with corneal haze, even after resolution of corneal edema.

The authors concluded that understanding the onset of structural changes in the course of Fuchs dystrophy might help determine the timing for intervention in this disease.

Ophthalmology summaries are written by Lori Baker Schena, EdD, and edited by John Kerrison, MD. American Journal of Ophthalmology summaries are edited by Thomas J. Liesegang, MD. JAMA Ophthalmology summaries are written by the lead authors.

ROUNDUP OF OTHER JOURNALS

Primary Trabeculectomy in Diabetic Patients With Primary Open-Angle Glaucoma

British Journal of Ophthalmology
Published online Jan. 26, 2013

Law et al. compared long-term control of intraocular pressure (IOP) in primary open-angle glaucoma patients with and without diabetes who underwent primary trabeculectomy with adjunctive mitomycin C (MMC). The authors found that long-term IOP was poorly controlled in eyes of diabetic patients compared with matched control patients without diabetes.

This retrospective, case-control study involved 41 eyes of 29 diabetic patients and 81 eyes of 64 nondiabetic patients who had all undergone MMC trabeculectomy. The investigators matched each eye of diabetic patients to two control eyes of nondiabetic patients based on age, sex, race, preoperative IOP, number of glaucoma medications, and lens status. The authors defined surgical success as IOP of between 5 and 15 mmHg without complications or the need for additional glaucoma surgery.

Kaplan-Meier cumulative success rates at 60 months were 57.8 percent for the diabetic group and 68.6 percent for the nondiabetic group. The mean trabeculectomy survival times were 63 months for the diabetic group and 74.6 months for the nondiabetic group. Finally, the mean postoperative IOP of the nondiabetic group was statistically significantly lower at two, three, six, and seven years' follow-up. Cumulative surgical survival rate, additional glaucoma surgeries required, and number of glaucoma medications used did not differ significantly between the two groups over the course of the study.

The investigators speculated that a higher concentration or longer duration of MMC application might result in better IOP control in patients with diabetes.

Endothelial Keratoplasty for Iridocorneal Endothelial Syndrome

Eye
Published online Jan. 25, 2013

Penetrating keratoplasty is the traditional treatment approach for iridocorneal endothelial (ICE) syndrome, a condition involving abnormal proliferation of corneal endothelium that leads to corneal edema. Chaurasia et al. found that endothelial keratoplasty—combined with good control of IOP—is a viable option in the management of this syndrome.

This retrospective case series involved eight eyes of seven patients with ICE syndrome who underwent endothelial keratoplasty to treat their corneal edema. Mean patient age was 50.4 years, and mean follow-up was 12.5 months. The investigators used the Moria Automated Lamellar Therapeutic Keratoplasty microkeratome system for the donor cornea dissection. All eyes except one underwent stripping of the Descemet membrane. The investigators also used a Sheets IOL glide and inserted the donor lenticule using the push-in technique, protecting the endothelium with sodium hyaluronate 1 percent.

Corneal clarity was restored in all eyes and was maintained through the last follow-up. Best-corrected visual acuity ranged from 20/50 to 20/30. Adequate control of glaucoma was the paramount factor in maintaining good visual acuity in these eyes. Four patients had acute rise in IOP during the postop period, which was effectively controlled with medication. One patient who was noncompliant with medications and regular follow-up advice had progression of glaucomatous disc changes and visual field loss.

The authors concluded that patients undergoing endothelial keratoplasty for ICE syndrome should be followed up regularly and probably at more frequent intervals to closely monitor for IOP control.

Comparison of the Corvis ST With Noncontact and Goldmann Applanation Tonometers

Investigative Ophthalmology & Visual Science
2013;54(1):659-665

The Corvis ST (Oculus) is a new noncontact tonometer that visualizes and measures the dynamic reaction of the cornea to an air impulse. Hong et al. compared IOP measurements from the Corvis ST, a traditional noncontact tonometer (NCT), and a Goldmann applanation tonometer (GAT). They found that while the Corvis ST demonstrated excellent consistency, it tended to yield lower IOP measurements than the other two devices.

The authors enrolled 59 participants (36 glaucoma patients and 23 control volunteers). One eye from each patient was selected randomly for further study. IOP measurements were obtained with the Corvis ST, NCT, and GAT by two experienced clinicians, and values were compared. Mean IOP for all examined eyes was 18.9 ± 5.8 mmHg for the Corvis ST, 21.3 ± 6.8 mmHg for the NCT, and 20.3 ± 5.7 mmHg for the GAT. The difference in IOP measurement between the Corvis ST and NCT was statistically significant. Correlation analysis showed a high correlation between each pair of devices. The Corvis ST displayed the best intraobserver variability and interobserver variability. Bland-Altman analysis revealed a bias between the Corvis ST and GAT, the Corvis ST and NCT, and the GAT and NCT.

While the Corvis ST constitutes a new option for measuring IOP, the researchers concluded that it might not provide an accurate IOP measurement, as Corvis ST readings were, on average, 1.3 mmHg lower than the GAT and 2.4 mmHg lower than the NCT.

Roundup of Other Journals is written by Lori Baker Schena, EdD, and edited by Deepak P. Edward, MD.