Slit Beam Width Affects Anterior Chamber Cells Grading

The Effect of Biomicroscope Illumination System on Grading Anterior Chamber Inflammation.

Wong I, Nugent A, et al:

Am J Ophthalmol 2009; 148 (October): 516-520

The slit beam width and intensity have a dramatic effect on the grading of anterior chamber cells.

Objective: To determine how biomicroscope illumination affects the grading of anterior chamber inflammation.
Design: Laboratory investigation.
Methods: An artificial anterior chamber was designed to replicate the optical characteristics of the human anterior chamber. This chamber was filled with 5 micrometer polystyrene beads suspended in alcohol at 2 different concentrations: 1 set to correspond to 1+ and the other set to 2+ anterior chamber cells based upon the Standardized Uveitis Nomenclature system. Measurements were made with a constant beam height of 1 mm and variable beam width between narrow and wide, 1 mm setting. All measurements were made with the maximum light intensity using 3 different Haag Streit BM 900 Model biomicroscopes. The effect of beam width and of the instrument used to make the observation was evaluated with regard to the number of particles observed, which was measured using a video photographic system.
Results: The number of beads visualized in the anterior chamber increased dramatically as a function of increasing beam width. At the maximum 1 mm beam width setting, the number of anterior chamber cells visualized was >5 times more than with a narrow beam width. In addition, a 3-fold difference in the number of beads observed was encountered as a function of the instrument used to make the observation, indicating that differences in the optical and illumination characteristics of slit lamps also affect the measurement significantly.
Conclusions: The grading of anterior chamber inflammation is significantly affected by beam width and by the level of illumination, which can vary considerably even using different slit lamps of the same design.
Reviewer's Comments: We should all be aware of the numerous factors that can affect the grading of anterior chamber inflammation, and do the best we can to minimize this variation by using uniform illumination and beam size when evaluating patients. This is particularly important since decision making with regard to the use of anti-inflammatory therapy for patients with anterior segment inflammation is based heavily on the grading of anterior chamber cells. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Eye, Biomicroscope, Illumination

Print Tag: Refer to original journal article

Age Predicts Success of Spectacles in Correcting Accommodative Esotropia

A Data-Driven Approach to the Management of Accommodative Esotropia.

Reddy A, Freeman C, et al:

Am J Ophthalmol 2009; 148 (September): 466-470

Younger age at the time of presentation, lower hyperopia, and larger angle of deviation are associated with lower success of treatment of accommodative esotropia with single-vision glasses.

Objective: To evaluate the association between clinical findings at the time of initial examination and the success of treatment of accommodative esotropia with single-vision spectacle correction.
Design: Retrospective, observational clinical case series.
Methods: Clinical records of a consecutive series of 68 children with accommodative esotropia were reviewed. Patients were excluded if they had a history of spectacle use before initial examination, if they had ocular pathology other than accommodative esotropia and associated refractive error, or if there was <2 years of follow-up data available. The primary outcome measure was the ability to achieve functional alignment with single-vision spectacle correction of the full cycloplegic refractive error.
Results: The age at the time of provision of single-vision spectacle correction, the mean cycloplegic refractive error, and the uncorrected distance deviation were all found to be statistically significant predictors of the probability of successful ocular alignment with single-vision distance correction. Younger children, those with less severe hyperopia, and those with larger angles of deviation had a lower probability of successful ocular alignment with hyperopic correction alone. The difference between the esodeviation at distance and near was not predictive of the need for bifocal therapy.
Conclusions: Clinical findings at the time of initial diagnosis are predictive of the success of single-vision distance glasses in achieving ocular alignment in children with accommodative esotropia.
Reviewer's Comments: In this study, two thirds of children had successful outcomes with single-vision distance glasses alone. The fact that clinical findings at the time of initial diagnosis were not predictive of the need for bifocal therapy indicates that single-vision distance glasses should generally be prescribed first, since even children with greater esodeviation near than at distance may achieve ocular alignment without bifocals. It seems clear as well that, while some children may require surgery in spite of refractive correction, less-invasive treatment with spectacles should be attempted first in order to identify children who really need surgery and to determine the amount of strabismus surgery that will be required once accommodation has been relaxed with the use of spectacles. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Esotropia

Print Tag: Refer to original journal article

Corneal Epithelial Opacity Associated with DTS Severity

Corneal Epithelial Opacity in Dysfunctional Tear Syndrome.

Chen J, Rao K, et al:

Am J Ophthalmol 2009; 148 (September): 376-382

Opacity and irregularity of the corneal epithelium results in decreased visual acuity in individuals with dysfunctional tear syndrome.

Objective: To evaluate the characteristics of the corneal epithelium in patients with dysfunctional tear syndrome (DTS), using scanning laser confocal microscopy, and to correlate these findings with other clinical findings in these patients.
Design: Prospective case-control study:
Participants/Methods: 31 patients with newly diagnosed dysfunctional tear syndrome and 21 healthy control subjects were recruited for this study. Individuals with DTS were classified into 4 severity categories based on standardized criteria. Patients underwent clinical examination, which included measurement of tear breakup time and grading of the severity of staining of the cornea and conjunctivae. Imaging with the Heidelberg Retinal Tomograph II Rostock corneal module allowed the acquisition of high-resolution images of the corneal epithelium and the measurement of the area of corneal epithelial opacity in each subject. Statistical analysis was performed to correlate this area with other clinical findings in each subject.
Results: The mean area of opaque superficial corneal epithelial cells was significantly greater in DTS patients then in normal control subjects (P <0.001). The severity of DTS was significantly associated with the area of opaque corneal epithelium. In addition, best-corrected visual acuity, subjective reports of blurred vision, and conjunctival and corneal staining were all associated with the area of opaque corneal epithelial cells.
Conclusions: Irregularity and opacity of corneal epithelial cells is present in patients with DTS and appears to account for changes in visual acuity.
Reviewer's Comments: This study is important in that it provides objective evidence of corneal epithelial irregularity and opacity and the association with changes in visual acuity. It also illustrates potential of corneal imaging in the diagnosis and management of patients with DTS. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Dry Eye, Diagnostic Techniques

Print Tag: Refer to original journal article

Systemic Absorption of Triamcinolone After Posterior Sub-Tenon Injection

Systemic Absorption of Triamcinolone Acetonide After Posterior Sub-Tenon Injection.

Zaka-ur-RAB S, Mahmood S, et al:

Am J Ophthalmol 2009; 148 (September): 414-419

Posterior sub-Tenon injection of triamcinolone acetonide gives similar systemic dose of corticosteroids as a single dose of intravenous methylprednisolone.

Objective: To evaluate systemic absorption of triamcinolone acetonide after posterior sub-Tenon injection.
Prospective: Prospective, interventional clinical case series.
Methods: 35 patients who required posterior sub-Tenon injection of 40 mg of triamcinolone acetonide following extracapsular cataract surgery were enrolled in the study. Patients who had received any form of systemic steroid during the previous 6 weeks were excluded. Blood samples were obtained at intervals of 1, 2, 3, 24, and 48 hours after injection. Additional blood samples were obtained at intervals of 1, 2, and 6 weeks after injection. Serum triamcinolone acetonide levels were measured from these blood samples using high-performance liquid chromatography.
Results: Significant levels of the drug were detected in 45% of samples 1 hour after sub-Tenon injection. Significant drug levels were seen in 100% of samples between 2 and 24 hours after injection. By 2 weeks after injection, no detectable drug levels were seen. The peak blood concentration of triamcinolone was observed 2 hours after injection at 47.1 ng/mL.
Conclusions: Posterior sub-Tenon injection of 40 mg of triamcinolone acetonide results in clinically significant systemic absorption of the corticosteroid.
Reviewer's Comments: Taking into account the relative potency of triamcinolone acetonide and the measured concentrations, the authors noted that a single dose of 40 mg of posterior sub-Tenon triamcinolone resulted in similar corticosteroid levels as a single dose of 1000 mg of methylprednisolone administered intravenously. Consequently, similar precautions in patients with diabetes or other conditions that may be influenced by pulse corticosteroids should be used when administering triamcinolone acetonide as when using single dose pulse intravenous steroids. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Drugs, Systemic Effects

Print Tag: Refer to original journal article

IOP With Pseudoexfoliation Increases Glaucoma Risk

Increased Likelihood of Glaucoma at the Same Screening Intraocular Pressure in Subjects With Pseudoexfoliation: The Thessaloniki Eye Study.

Topouzis F, Harris A, et al:

Am J Ophthalmol 2009; 148 (October): 606-613

Ocular hypertension due to pseudoexfoliation is associated with a higher risk of development of glaucomatous optic nerve damage than primary ocular hypertension.

Objective: To compare the clinical characteristics of primary open-angle glaucoma and pseudoexfoliation glaucoma in a population-based cohort.
Design: Cross-sectional, population-based study.
Methods: 2261 individuals in an urban Greek population participated in this study. All subjects were ≥60 years of age at the time of examination. A medical history and a comprehensive ophthalmic examination, including visual field testing, were performed. Individuals with glaucomatous optic nerve damage were classified as glaucoma subtype. The intraocular pressure distribution among individuals with primary open-angle glaucoma and pseudoexfoliation glaucoma was compared.
Results: Primary open-angle glaucoma was present in 4.2% of the population, while pseudoexfoliation glaucoma was present in 1.8%. The probability of having glaucomatous optic nerve damage among individuals with pseudoexfoliation was 15.2%. In contrast, glaucoma was present in only 4.7% of those without pseudoexfoliation. In individuals with ocular hypertension without glaucoma associated with pseudoexfoliation, the probability of having glaucomatous optic nerve damage was found to be higher than those with primary ocular hypertension (37% vs 15%; *P* =0.004).
Conclusions: Ocular hypertension due to pseudoexfoliation has a higher risk of progression to glaucoma. Pseudoexfoliation glaucoma is associated with a higher intraocular pressure than primary open-angle glaucoma.
Reviewer's Comments: This study should remind us that individuals with pseudoexfoliation glaucoma must be treated more aggressively and followed up more closely due to the tendency toward higher intraocular pressures. In addition, ocular hypertension due to pseudoexfoliation should generally not be monitored without treatment, as we often do in lower-risk individuals with primary ocular hypertension. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Secondary Glaucoma

Print Tag: Refer to original journal article

Some Patients Lose Vision After Nonocular Surgeries

The Prevalence of Perioperative Visual Loss in the United States: A 10-Year Study from 1996 to 2005 of Spinal, Orthopedic, Cardiac, and General Surgery.

Shen Y, Drum M, et al:

Anesth Analg 2009; 109 (November): 1534-1545

The risk of postoperative visual loss from nonocular surgery is greatest with cardiac surgery followed by spinal surgery.

Background: The Nationwide Inpatient Sample (NIS) is the biggest inpatient database in the United States. It contains data from approximately 1000 randomly selected nongovernment hospitals. Perioperative visual loss (POVL) can accompany nonocular surgery.
Objective: To establish the prevalence of POVL in the United States among common nonocular surgeries.
Design: Retrospective, observational database study.
Participants: 5.6 million patients in the NIS.
Methods: The authors collected data on the 8 most common nonocular and nongynecological surgical procedures from 1996 to 2005: cardiac surgery, laminectomy without fusion, colorectal resection, appendectomy, spinal fusion, hip surgery, cholecystectomy, and knee arthroplasty. Only the primary procedure code was used for classification. A patient with codes for sudden visual loss, ischemic optic neuropathy (ION), cortical blindness, or retinal vascular occlusion during the same hospitalization as the surgery were classified as having POVL. To determine trends, the authors divided the database into five 2-year periods.
Results: Of the 5.6 million surgical discharges, 1326 also had a code for visual loss. The most common was cardiac surgery (704) followed by spinal fusion (140). The least common was appendectomy (<10). Most of the cardiac patients (75%) lost vision from a retinal vascular occlusion, while 15% had ION, and 10% had cortical blindness. In spinal surgery, 50% had cortical blindness, 30% had ION, and 20% retinal vascular occlusion. Interestingly, the highest prevalence was among patients <18 years of age, primarily from cortical blindness. Predictors of POVL included male gender, anemia, blood transfusion, and Charlson comorbidity index. Overall, the POVL incidence declined from 1996 to 2005.
Conclusions: The incidence of POVL decreased over the study period. The risk increased with male gender and comorbidity index and was highest with cardiac and spinal surgery.
Reviewer's Comments: This is a very large database, and it confirms that POVL occurs most commonly in cardiac surgery than in spinal surgery. As with all studies of this nature, not all of the data that we need are present in this study. The greatest downer is the lack of ability to confirm the diagnosis code used. (Reviewer-Michael S. Lee, MD).

Keywords: Perioperative, Postoperative, Optic Neuropathy, Retinal Artery Occlusion, Anterior, Posterior, Hypotension, Shock

Print Tag: Refer to original journal article

Diplopia Can Be Caused by Antibiotics

Diplopia and Fluoroquinolones.

Fraunfelder FW, Fraunfelder FT:

Ophthalmology 2009; 116 (September): 1814-1817

Fluoroquinolone antibiotics may possibly cause diplopia.

Background: Fluoroquinolone antibiotics have been associated with tendinitis and tendon rupture. Preclinical trials noted diplopia among some subjects. Reports of diplopia with fluoroquinolone use have been received by the National Registry of Drug-Induced Ocular Side Effects.
Objective: To describe a possible association between fluoroquinolone use and diplopia.
Design: Retrospective, observational database study.
Participants: 171 subjects from around the world reported to various databases.
Methods: Data were collected from the National Registry of Drug Induced Ocular Side Effects, the World Health Organization (WHO), and the Food and Drug Administration between 1986 and 2009. Additional reports were obtained from a Medline search. An assessment of causality was made using published criteria from the WHO.
Results: Diplopia was reported in 171 patients taking 6 different fluoroquinolones, with most cases occurring from ciprofloxacin (45%). There were 91 women and 76 men with a median age of 52 years. In each reported case, the dose of fluoroquinolone taken was within the recommended range according to the package insert. Ten percent of patients also had a tendinitis at the same time as the diplopia. Only 86 reports noted the timing of diplopia. After the start of fluoroquinolone use, the median time to symptoms of diplopia was 10 days. In 53 cases, stopping the fluoroquinolone resulted in resolution of symptoms (positive dechallenge). Five patients took fluoroquinolone antibiotics again and experienced recurrence of diplopia (positive rechallenge). This suspected adverse drug reaction is considered "possible" (a clinical event, with a reasonable time sequence that could also be explained by concurrent disease or other drugs or chemicals). Information on drug withdrawal may be lacking or unclear) according to the WHO.
Conclusions: There is a possible association between fluoroquinolone use and diplopia.
Reviewer's Comments: Examples of fluoroquinolone antibiotics include moxifloxacin, ciprofloxacin, norfloxacin, ofloxacin, gatifloxacin, and levofloxacin. If you see a patient with new-onset, unexplained diplopia, look at their medication list. If the patient is on a fluoroquinolone antibiotic, consider asking the prescriber to discontinue or change the antibiotic and see if this improves the diplopia. (Reviewer-Michael S. Lee, MD).

Keywords: Diplopia, Double Vision, Antibiotics, Side Effect, Fluoroquinolone

Print Tag: Refer to original journal article

Functional Vision Loss Linked to Psychiatric Illness

Functional Visual Loss in Idiopathic Intracranial Hypertension.

Ney J, Volpe N, et al:

Ophthalmology 2009; 116 (September): 1808-1813

Functional visual loss occurs in approximately 5% of patients with pseudotumor cerebri and typically manifests as visual field loss.

Background: The worst thing that can happen in idiopathic intracranial hypertension (IIH) is visual loss. In cases in which visual loss is moderate to severe, patients often elect to undergo surgical intervention such as optic nerve sheath fenestration (ONSF) or a shunting procedure. We depend on subjective testing (acuity and fields) to assess visual function, and functional visual loss further complicates decision-making.
Objective: The authors describe the incidence and clinical characteristics of functional visual loss (FVL) among patients with IIH.
Design: Retrospective, observational case series.
Participants: 281 patients from 2 institutions in Philadelphia.
Methods: Patients were identified using billing records and personal databases of the investigators. All patients met the modified Dandy criteria for IIH and were >18 years of age. Functional visual loss was determined using standard techniques (tangent screen, perimetry, monocular optokinetic nystagmus (OKN) responses, prism dissociation, stereoacuity, etc).
Results: 17 (6%) women were diagnosed with FVL, with a mean age of 34 years. Approximately two-thirds were diagnosed at initial presentation, and one-third developed FVL during follow-up. Only one-third had loss of acuity, while all patients had functional visual field loss. Three-fourths of these patients had relatively normal-appearing nerves despite severe visual field loss. Of the 11 patients presenting with FVL, only 1 showed improvement, while 2 worsened, and the rest remained stable. Of the 6 patients who developed FVL during follow-up, only 2 enjoyed incomplete improvement. Overall, 11 patients showed progressive loss of visual function. In 5 patients, it could not be determined if all of the loss was completely nonorganic and if they underwent ONSF. Four patients had active disability claims, 3 were bipolar, and 4 had substance abuse.
Conclusions: Functional visual loss occurs in approximately 5% of patients with IIH. The majority of these patients had psychiatric illness or psychosocial issues.
Reviewer's Comments: It can be terribly challenging to determine if progressive visual loss in your patient with IIH is real, functional, or both. If the nerve looks normal, I recheck opening pressures to see if there is legitimate intracranial hypertension. If the nerve looks abnormal, sometimes you have to err on the side of caution. These authors were forced to operate on 5 patients because they could not tell. While ONSF is relatively safe, it validates the visual loss as real. (Reviewer-Michael S. Lee, MD).

Keywords: Functional, Nonphysiologic, Nonorganic, Vision, Visual, Pseudotumor Cerebri, Idiopathic Intracranial Hypertension

Print Tag: Refer to original journal article

Red and Blue Lights Can Do More Than Stop a Speeding Car

Chromatic Pupil Responses: Preferential Activation of the Melanopsin-Mediated Versus Outer Photoreceptor-Mediated Pupil Light Reflex.

Kardon R, Anderson S, et al:

Ophthalmology 2009; 116 (August): 1564-1573

It is possible to determine that a patient has retinal ganglion cell loss by looking at the pupillary response to varying intensity red and blue lights.

Background: Retinal ganglion cell axons eventually join together to become the optic nerve. Some of these cells contain melanopsin, which activates to bright blue light but not to red light. Patients lose vision for various reasons, and it can be challenging to determine the cause. A device that could quickly, easily, and objectively distinguish between photoreceptor and retinal ganglion cell damage would be beneficial.
Objective: The authors subjected normal individuals to red and blue light at various intensities to establish a normative database. They then studied patients with rod, cone, and optic nerve disorders with the same testing.
Design: Prospective, observational case series.
Participants: 43 normal subjects and 3 patients with various forms of visual loss from a single center in Iowa.
Methods: Each subject had 1 eye patched. The other eye gazed at the center of a Ganzfeld bowl through a 12-diopter convex lens under mesopic conditions. Pupillography was recorded during exposure to red or blue light at 3 different brightnesses: low intensity (1 cd/m2), medium intensity (10 cd/m2), and high intensity (100 cd/m2). After creating a normative database, the authors subjected 3 patients with rod dysfunction, cone dysfunction, or ischemic optic neuropathy to the same stimuli.
Results: Using the normative database, the authors made several observations. (1) Red light has a long wavelength and activates photoreceptor, predominantly cones. (2) Red light does not affect melanopsin-containing retinal ganglion cells (RGC). (3) Blue light has a short wavelength and activates predominantly rods at lower intensities and melanopsin containing RGC at higher intensities. See the article for a table-form summarization of their findings.
Conclusions: By preferentially altering the wavelength and intensity of the light stimulus, one can grossly identify rod, cone, and RGC loss using the papillary reaction.
Reviewer's Comments: This looks like the groundwork for a new electrophysiologic machine in ophthalmology and neuro-ophthalmology. The protocol takes 13 seconds for each red and each blue light. So in about 2 minutes, this test could help distinguish patients with outer retinal (photoreceptor) versus inner retinal (ganglion cell and optic neuropathy) based on their pupillary response. This looks pretty slick, but I think it will give us trouble for patients with retinal artery occlusion and retinal vein occlusion. This results in melanopsin RGC injury, which could be confused with optic neuropathies. Since the authors tested only 3 patients who had clear-cut, substantial injury to rods, cones, or ganglion cells, it will be interesting to see how they do with mild to moderate disease. (Reviewer-Michael S. Lee, MD).

Keywords: Blue Light, Red Light, Chromatic Light, Pupil, Pupillary, Melanopsin, Photoreceptor

Print Tag: Refer to original journal article

Meditoxin May Be the New Botox

Double-Blind, Randomized, Comparative Study of Meditoxin Versus Botox in the Treatment of Essential Blepharospasm.

Yoon J, Kim J, et al:

Korean J Ophthalmol 2009; 23 (September): 137-141

Meditoxin, a form of botulinum toxin type A made in Korea, shows similar safety and efficacy to Botox for the treatment of blepharospasm.

Background: Botulinum toxin type A (BTX-A) is one of the most common treatments for benign essential blepharospasm (BEB). There are 5 commercially available preparations of BTX-A in the world: Botox, Dysport, Xeomin, Prosigne, and Meditoxin.
Objective: The authors compared Meditoxin and Botox for the treatment of BEB.
Design: Randomized, double-masked, interventional clinical trial.
Participants: 60 patients with BEB from 2 centers in Korea.
Methods: Patients with BEB could be included if they did not meet any of the following exclusionary criteria: any surgical treatment of BEB, BTX-A injection within 3 months of study entry, or current pregnancy. Each patient was randomized, and both patient and study investigator were masked to study medication. Each vial of either Meditoxin or Botox was diluted to achieve a concentration of 5 units/0.1 mL. The maximum dose was 60 units. The main outcome measure was the percentage of patients achieving improvement of spasm severity of >1 grade at 4 weeks (0 to 4 scale). Secondary outcome measures included eyelid closing force (1 to 4 scale), functional vision status (1 to 6 scale), and number of days until patient desired retreatment. BTX-A antibody testing was performed at the conclusion of the study.
Results: Of 60 patients recruited, 31 were randomized to Meditoxin and 29 to Botox. Twenty-six patients completed the study in each group. Reasons for withdrawal were either patients failing exclusionary criteria (6 patients) or noncompletion of follow-up (2 patients). There were 25 women in each group, with a mean age of approximately 61 years. At baseline, the groups did not differ in the number of previous injections, spasm score, eyelid closure, or functional vision score. At 1 month, there was no significant difference between groups for these scores, the change in spasm score, or days until retreatment. The frequency of adverse events did not differ between groups. No patient was positive for the antibodies.
Conclusions: Meditoxin is as safe and effective as Botox in the treatment of BEB.
Reviewer's Comments: This looks like a well-performed study. I think we need larger studies with more patients to truly determine if these 2 treatments are equivalent. (Reviewer-Michael S. Lee, MD).

Keywords: Botox, Meditoxin, Dysport, Xeomin, Prosigne, Botulinum Toxin, Blepharospasm

Print Tag: Refer to original journal article

Is Stereoacuity Affected by MS?

Stereoacuity Testing Discloses Abnormalities In Multiple Sclerosis Without Optic Neuritis.

Sobaci G, Demirkaya S, et al:

J Neuroophthalmol 2009; 29 (September): 197-202

Randot stereoacuity testing is frequently abnormal among MS patients with no history of optic neuritis.

Background: Patients with multiple sclerosis (MS) develop visual function deficits regardless of whether they have experienced optic neuritis. Various tests including visual-evoked potential, optical coherence tomography, and contrast sensitivity are abnormal in a percentage of patients with MS.
Objective: The authors tested stereoacuity among a group of MS patients.
Design: Prospective, observational case series.
Participants: 23 patients with MS and 23 controls from a single institution in Turkey.
Methods: Test subjects had to carry a diagnosis of definite MS. Their acuities had to be at least 20/20 in each eye with no history of optic neuritis. Each patient had to be in remission for at least 6 months. Any patient with visual complaints in the past was excluded. A group of controls matched for age and gender was selected. Controls did not have any known ophthalmologic or systemic diseases. Each participant underwent a pattern visual-evoked potential (PVEP). Only the right eye of each subject was included in the analysis. Stereoacuity was assessed using the Randot stereoacuity (RSA) distance. The polarizing filters were placed over existing spectacles or trial frames. Stereoacuity was measured using a range of 400 to 20 seconds of arc, where lower values represent better stereoacuity.
Results: There were 15 women and 8 men in each group, with a mean age of 35 years. In the MS group, 75% had relapsing-remitting MS, 3 had secondary progressive MS, and 1 had relapsing progressive MS. The disease duration averaged 4 years. Sixty percent of the MS patients showed a delay in P100 latency. The mean RSA score was 80 seconds in the MS patients and 20 seconds in controls (P <0.001). Using 95% confidence intervals, 30 seconds of arc was considered the threshold for normal. In the MS group, 75% had RSA scores outside this normative limit. The P100 latency and RSA score correlated with one another.
Conclusions: MS patients without optic neuritis often have subclinical deficiencies in stereoacuity.
Reviewer's Comments: MS patients often have normal acuities and visual fields yet complain of vague visual symptoms. You could consider checking stereocuity to help support or mitigate their complaints. (Reviewer-Michael S. Lee, MD).

Keywords: Stereoacuity, Multiple Sclerosis, Stereo, MS

Print Tag: Refer to original journal article

Ethambutol May Cause Toxic Optic Neuropathy

Prospective Evaluation of Visual Function for Early Detection of Ethambutol Toxicity.

Menon V, Jain D, et al:

Br J Ophthalmol 2009; 93 (September): 1251-1254

Consider obtaining a pattern VEP and OCT to monitor patients taking ethambutol.

Background: Ethambutol is frequently used to treat tuberculosis. Unfortunately, this treatment may cause a dose-dependent toxic optic neuropathy. The reported incidence of toxicity at doses of 15 to 20 mg/kg per day is approximately 1%.
Objective: To evaluate various clinical and electrophysiologic tests to detect early toxicity.
Design: Prospective, observational case series.
Participants: 52 patients treated with ethambutol at a single center in India.
Methods: Patients with tuberculosis undergoing treatment with ethambutol at a dose of 15 to 20 mg/kg per day for 2 months were enrolled. All patients received free medication and were required to take the ethambutol in front of study personnel. Patients with any other disease or intake of drugs known to cause optic neuropathy, baseline dyschromatopsia, or ocular or central nervous system tuberculosis were excluded. Visual testing included early treatment diabetic retinopathy study acuity, Ishihara plate and Oculus anomaloscope color testing, Pelli-Robson contrast sensitivity, Amsler grid testing, Goldmann visual fields, stereoacuity, pattern visual-evoked potential (VEP), and peripapillary retinal nerve fiber layer (RNFL) imaging using optical coherence tomography (OCT). Examinations were performed before drug initiation and then monthly. A final examination occurred 1 month after drug discontinuation.
Results: There were 29 men and 23 women, with a mean age of 28 years. Acuity, stereoacuity, contrast sensitivity, Amsler grid, and color vision testing did not change. Constriction of peripheral isopters occurred in both eyes of 4 patients with visual field testing. This persisted in 4 eyes of 3 patients at the final visit. Pattern VEP showed a significant P100 delay (>10 msec) in 15 eyes of 11 patients. This resolved in 12 eyes at the final visit. Mean RNFL did not change from initial to final visit. A significant decrease in temporal quadrant RNFL thickness (>20 microns) was observed in 3 eyes of 2 patients. No patient-described symptomatic visual changes occurred in this study. Overall, subclinical deficits were observed in 20 of 104 eyes (19%), and reversal of these deficits occurred in 80% 1 month after drug discontinuation.
Conclusions: Pattern VEP and OCT represent tests that may identify patients with early ethambutol toxicity.
Reviewer's Comments: The VEP and OCT are objective tests but also come with some variability in quality. Most patients in the US get treated for 6 to 12 months with ethambutol and the question that is not answered here is whether we should stop treatment if the VEP and OCT changes after only 1 month. (Reviewer-Michael S. Lee, MD).

Keywords: Ethambutol, Toxicity, Monitor, Evaluation

Print Tag: Refer to original journal article

Superior Oblique Myokymia Treated With Myectomy

Superior Oblique Myectomy and Trochlear Resection for Superior Oblique Myokymia.

Ruttum M, Harris G:

Am J Ophthalmol 2009; 148 (October): 563-565

Patients with superior oblique myokymia may benefit from resection of the ipsilateral trochlea and a portion of the superior oblique muscle.

Background: Patients with superior oblique myokymia (SOM) experience intermittent, involuntary superior oblique contraction lasting seconds. Symptoms include vertical diplopia and oscillopsia. When present, signs often require a slit lamp to observe very small-amplitude torsional nystagmoid movements of the affected eye. Traditional treatments include anti-epileptic medications, superior oblique tenectomy, or inferior oblique myectomy. Patients may suffer from recurrence postoperatively if adhesions develop.
Objective: The authors describe an alternative surgical technique for the treatment of SOM.
Design: Retrospective case series.
Participants: 3 patients with SOM from a single center in Wisconsin.
Methods: Through an upper lid crease incision, the trochlea along with a 1-cm segment of the superior oblique muscle was removed. A drain was left in place and pulled the following day.
Results: A 37-year-old woman underwent a right superior oblique tenectomy. Her symptoms returned, and 2 years later, she underwent a right superior oblique myectomy and trochlear resection. Telephone contact 22 years later revealed no recurrence of SOM symptoms. A 48-year-old man had a left superior oblique tenectomy and inferior oblique myectomy. He underwent an exploration with lysis of adhesion for recurrence. Symptoms recurred, and he underwent trochlear resection and superior oblique myectomy. He reported no symptoms of SOM 2 years later. A 53-year-old woman failed medical therapy. She underwent the authors' procedure as a primary surgical treatment. One year postoperatively, she reported no oscillopsia. All 3 patients noted numbness in the supratrochlear region and some residual postoperative diplopia, which was treated with prism in 1 patient.
Conclusions: It may be reasonable to resect the trochlea and a portion of the superior oblique muscle to treat superior oblique myokymia. This could be considered primary or secondary option.
Reviewer's Comments: It has been my experience that medical therapy typically fails at some point. However, most patients do not want to have a superior oblique tenectomy and inferior oblique myectomy unless they are desperate. I agree with the authors that it is not unusual for symptoms to recur after tenectomy because the muscle continues to contract, and any adhesions to the globe will result in myokymia. I think this is a great idea and would consider asking my oculoplastics colleagues to consider it. (Reviewer-Michael S. Lee, MD).

Keywords: Superior Oblique, Trochlear, Myectomy Resection, Myokymia

Print Tag: Refer to original journal article

Fourier-Domain OCT Better Than Time-Domain OCT

Comparison of Clinically Relevant Findings From High-Speed Fourier-Domain and Conventional Time-Domain Optical Coherence Tomography.

Keane P, Bhatti R, et al:

Am J Ophthalmol 2009; 148 (August): 242-248

Spectral-domain (also called Fourier-domain) OCT appears to allow the detection of vitreoretinal pathology that is not visible with conventional time-domain OCT.

Objective: To compare the sensitivity of Fourier-domain optical coherence tomography (FD-OCT; Topcon, Inc) and conventional time-domain (TD-OCT; Stratus OCT, Carl Zeiss Meditec, Inc) in detecting clinically relevant findings in patients with vitreoretinal pathology.
Design: Prospective, observational clinical case series.
Methods: 50 eyes of 28 consecutive patients with common vitreoretinal disorders that were requested to obtain retinal imaging with TD-OCT underwent imaging with that instrument and also with a prototype FD-OCT instrument. Comparisons of the sensitivity in detecting features of the macula and vitreoretinal interface (including full-thickness and partial-thickness macular holes, epiretinal membranes, and vitreomacular traction) were performed.
Results: The sensitivity in detecting clinically relevant vitreoretinal pathology was 60% for TD-OCT and 94% for FD-OCT. In 78% of patients, features of the retina were detected only by FD-OCT and were not visible with TD-OCT. Particular clinical findings were found to be more readily detected with FD-OCT. These included diffuse intra-retinal edema, subretinal fluid, pigment epithelium detachments, and subretinal tissue.
Conclusions: FD-OCT appears to be superior to TD-OCT in detecting qualitative features of the macula and vitreoretinal interface. The greater sensitivity of the device may be of particular importance in patients with subtle clinical findings that are not readily detected by time-domain OCT.
Reviewer's Comments: FD-OCT, which is also called spectral-domain OCT, offers dramatically increased scan speed compared to TD-OCT, which allows increased resolution and more dense sampling from the scan region. This study illustrates the advantages of the technical improvements in imaging with this device, and it is likely to supplant TD-OCT as the devices become more widely available. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Retina Diagnostic Techniques

Print Tag: Refer to original journal article

Implantation of AGV Causes Progressive Corneal Endothelial Cell Loss

Changes in Corneal Endothelial Cells After Ahmed Glaucoma Valve Implantation: 2-Year Follow-up.

Lee E, Yun Y, et al:

Am J Ophthalmol 2009; 148 (September): 361-367

Proper placement of the tube away in the iris plane is important to avoid progressive corneal endothelial cell loss after implantation of a glaucoma implant.

Objective: To evaluate the effect of implantation of the Ahmed Glaucoma Valve (AGV) on the density of corneal endothelial cells.
Design: Prospective, observational clinical case series.
Methods: This study involved a consecutive series of 41 eyes of 41 patients who underwent implantation of the AGV for management of glaucoma refractory to other therapy. All patients underwent clinical examination and measurement of corneal endothelial cell density in both eyes prior to placement of the AGV. The fellow eye served as a control for the natural rate of decline of endothelial cell density in an un-operated eye. Follow-up examination with repeat specular microscopy took place at regular intervals for up to 2 years of follow-up. The change in endothelial cell count relative to baseline measurements was compared between the eye that underwent AGV implantation and the control eye.
Results: The mean age of patients in this series was 55 years. The mean reduction in endothelial cell count from baseline was 5.8% 1 month after surgery. Progressive decline in the endothelial cell density was observed over time, with a mean reduction of 11.5% at 6 months, 15.3% at 12 months, 16.6% at 18 months, and 18.6% at 24 months. Endothelial cell density declined the most in the region of the cornea overlying the tube insertion site.
Conclusions: Progressive corneal endothelial cell loss can occur after implantation of the AGV.
Reviewer's Comments: This study highlights the importance of proper placement of the tube when performing glaucoma implant surgery. This problem is not unique to the AGV but can occur with any glaucoma implant. The tube should be placed deep within the anterior chamber angle at the iris root, and in the plane of the iris to avoid intermittent contact of the tip or shaft of the tube with the corneal endothelium, either spontaneously with blinking or if the patient rubs his or her eye. In eyes with high anterior synechiae, the tube must be placed in the ciliary sulcus, or if a pars plana vitrectomy is performed, it can be safely placed in the posterior segment. Although a decrease in endothelial cell counts can occur with any intraocular surgery, the potential for eventual corneal decompensation is higher with this procedure, particularly if proper tube placement is not ensured. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Glaucoma Surgery, Corneal Complications

Print Tag: Refer to original journal article

Selenium Implicated in Pathogenesis of Glaucoma

Relationship Between Glaucoma and Selenium Levels in Plasma and Aqueous Humour.

Bruhn RL, Stamer W, et al:

Br J Ophthalmol 2009; 93 (September): 1155-1158

Although further investigation is required to determine a possible cause-and-effect relationship, either high or low selenium plasma and aqueous levels appear to be associated with POAG.

Objective: To investigate the relationship between plasma and aqueous humour selenium levels and glaucoma.
Design: Case-control study.
Participants/Methods: 47 individuals diagnosed with primary open-angle glaucoma (POAG) were prospectively enrolled in this study. An additional 54 individuals without glaucoma were also enrolled as control subjects. All prospective study subjects were being scheduled for ophthalmic surgery, either trabeculectomy or cataract extraction. At the time of surgery, samples of blood and aqueous humour were obtained, and the concentration of selenium in each sample was measured by high-performance liquid chromatography. Additional clinical and demographic factors were assessed by clinical examination and an interview. Statistical analysis allowed the comparison of selenium levels between POAG patients and control subjects, adjusting for age and other potential confounding factors.
Results: Compared to the 33% of individuals with the lowest plasma selenium levels, those with the highest levels had an increased risk of POAG (OR, 11.2; *P* =0.03). In contrast, those with intermediate plasma selenium levels had a reduced risk of POAG compared to those with lower levels (OR, 0.06; *P* =0.02).
Conclusions: Selenium appears to be associated with the risk of developing POAG.
Reviewer's Comments: Previous studies investigating vitamin supplementation and glaucoma suggested that elevated systemic selenium levels were associated with an increased risk of POAG. The results of this study agree with earlier trials, and further suggest that either low or high selenium levels may increase the risk of the disease. Further investigation is needed to determine a causal association and to identify a possible mechanism for selenium in the pathogenesis of POAG. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Primary Open-Angle Glaucoma

Print Tag: Refer to original journal article

Air Bubbles Can Cause Corneal Endothelium Trauma After DSAEK

Air Bubble-Associated Endothelial Trauma in Descemet Stripping Automated Endothelial Keratoplasty.

Hong A, Caldwell M, et al:

Am J Ophthalmol 2009; 148 (August): 256-259

Part of the reduction in corneal endothelial cell density after DSAEK may occur from trauma caused by the air bubble left in the anterior chamber after the procedure.

Objective: To evaluate corneal endothelial cell trauma by an anterior chamber air bubble following Descemet stripping automated endothelial keratoplasty (DSAEK).
Design: Laboratory investigation.
Methods: 12 donor corneas (6 pairs of corneas from both eyes of 6 donors free of corneal endothelial disease) were sectioned using a microkeratome to prepare the tissue in the same manner as is normally done for endothelial keratoplasty. One cornea of each pair was mounted on an artificial anterior chamber, which was then filled with an air bubble to occupy 40% of the anterior chamber volume. Rotation of the artificial anterior chamber 180 degrees with 50 repetitions was performed to simulate air bubble trauma as it may occur with normal body movement after surgery. The other cornea of each pair underwent a similar procedure but without placement of the air bubble or manipulation of the artificial anterior chamber. Corneal endothelial trauma was assessed by Trypan blue staining of the corneal endothelium and was compared between corneas of each pair.
Results: The proportion of viable graft endothelium was significantly greater in corneas that did not experience air bubble trauma (89.9% vs 79.4%; *P* =0.01).
Conclusions: Based on the results of this model, an immediate reduction of corneal endothelial cell viability of approximately 10% occurs in association with air bubble-induced trauma.
Reviewer's Comments: The amount of trauma induced by the air bubble in patients may differ from that in this simulation. However, it is clear that there is mechanical injury to the cornea as a result of the air bubble, as has been documented in other studies of the effect of air bubbles after other anterior segment surgical procedures. Further investigation is needed to determine how this trauma may be minimized and to develop alternative methods to induce adhesion between the endothelial graft and the corneal stroma in a less-traumatic fashion to decrease the likelihood of graft failure due to endothelial cell loss. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Keratoplasty, Complications

Print Tag: Refer to original journal article

Low Signal Strength Increases Variability of RNFL Thickness Measurements by OCT

Effect of Signal Strength and Improper Alignment on the Variability of Stratus Optical Coherence Tomography Retinal Nerve Fiber Layer Thickness Measurements.

Vizzeri G, Bowd C, et al:

Am J Ophthalmol 2009; 148 (August): 249-255

Good image quality is essential when attempting to detect progression of nerve fiber layer defects from a series of OCT scans.

Objective: To evaluate the effect of signal strength and alignment on variability in retinal nerve fiber layer (RNFL) thickness measurements by Stratus optical coherence tomography (OCT).
Design: Retrospective, longitudinal clinical study.
Methods: This study involved a consecutive series of glaucoma patients enrolled in a longitudinal study of glaucoma diagnosis who had at least 2 RNFL scans by OCT. Differences in RNFL thickness measurements and image quality (assessed by signal strength) were evaluated. In addition, the effect of misalignment of the scan circle in the horizontal and vertical directions was also evaluated. The effects were studied using linear regression analysis.
Results: 94 eyes of 94 subjects were included in the study. The difference in RNFL thickness measurements was greater for scans obtained on different days than those obtained on the same day. In addition, quadrant RNFL thickness values varied more widely than did the mean RNFL thickness. Lower signal strength and vertical misalignment of the scan were associated with greater variability in RNFL thickness measurements.
Conclusions: Low signal strength and vertical misalignment of the scan circle increase the variability of RNFL thickness measurements made by Stratus OCT.
Reviewer's Comments: The detection of progression of RNFL defects requires the distinction between expected test-retest variability and true change in the RNFL thickness. Any factor that increases variability of the measurement of RNFL thickness will interfere with the ability to identify progression. This study indicates that vertical scan misalignment and low signal strength both affect the interpretation of the test results. Signal strength should be at least 7 in order to be confident that poor image quality is not affecting the results. The scan location should also be verified to ensure that adequate centration has been achieved. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Glaucoma, Optic Nerve Imaging

Print Tag: Refer to original journal article

Atypical Retardation Pattern Interferes With Diagnosis of Glaucoma Progression

Impact of Atypical Retardation Patterns on Detection of Glaucoma Progression Using the GDx With Variable Corneal Compensation.

Madeiros F, Alencar L, et al:

Am J Ophthalmol 2009; 148 (July): 155-163

Some patients have atypical birefringence of the RNFL, limiting the utility of the scanning laser polarimetry (GDx) in measuring its thickness.

Objective: To evaluate the effect of atypical retardation patterns (ARPs) on the detection of progressive retinal nerve fiber layer (RNFL) thinning using scanning laser polarimetry (GDx) with variable corneal compensation (VCC).
Design: Prospective, observational cohort study.
Methods: Patients enrolled in this study were either glaucoma patients or glaucoma suspects who underwent serial imaging of the optic nerve with GDx VCC (Carl Zeiss Meditec, Inc). In addition, serial optic disc photographs and visual fields were performed over a mean follow-up of 4 years. Glaucoma progression or its onset was diagnosed on the basis of visual field testing, using the Guided Progression Analysis software for standard automated perimetry for the Humphrey automated perimetry. The presence and magnitude of ARPs were assessed using the typical scan score (TSS) measured on each image. Random-effects linear modeling was performed to determine the influence of the TSS on the assessment of RNFL thickness in stable and progressive glaucoma.
Results: 377 eyes of 221 patients were included in the study. Changes in TSS score from baseline were significantly associated with progressive thinning of the RNFL in both stable and progressing eyes. Each 1-unit increase in TSS score was associated with a 1.9 µm decrease in RNFL thickness over time (P =0.001).
Conclusions: ARPs affect the diagnosis of progressive thinning of the RNFL as measured by GDx VCC.
Reviewer's Comments: Clinicians who use GDx VCC for the monitoring of RNFL thickness in glaucoma patients and glaucoma suspects must be aware of the potential effect of atypical birefringence on measurements of RNFL thickness by this device. The TSS provided with the test results should be monitored over time. In patients with elevated values of this parameter or with fluctuation in its value, the diagnosis of glaucoma progression could be an artifact. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Glaucoma, Optic Nerve Imaging

Print Tag: Refer to original journal article

Does Amblyopia Cause Abnormal RNFL Thickness?

Retinal Nerve Fiber Layer Thickness in Amblyopic Eyes.

Repka M, Kraker R, et al:

Am J Ophthalmol 2009; 148 (July): 143-147

When evaluating patients suspected of having glaucoma, retinal nerve fiber layer thinning should not be attributed to amblyopia.

Objective: To investigate the association between amblyopia and retinal nerve fiber layer (RNFL) thickness.
Design/Methods: Prospective, cross-sectional, observational clinical case series involving a consecutive series of 37 children with 1 amblyopic eye. RNFL thickness measurements were made in both eyes using Stratus optical coherence tomography (OCT). Measurements were made in both eyes, with the nonamblyopic eye serving as a control. RNFL thickness measurements were compared between the 2 eyes to determine whether amblyopia has an effect on RNFL thickness.
Results: The mean RNFL thickness in amblyopic eyes was 111.4 µm in amblyopic eyes. This was not statistically different than the mean value observed in contralateral control eyes of 109.6 µm (mean difference, 1.8 µm; 95% CI, -0.6 µm to 4.3 µm). A similar proportion of patients had measured thickness at least 8 µm greater in their amblyopic eye as had this degree of difference with greater thickness in their nonamblyopic eye.
Conclusions: This study indicates that amblyopia has no effect on RNFL thickness in children.
Reviewer's Comments: Several factors need to considered in the evaluation of RNFL thickness measurements in patients suspected of having glaucoma. Myopia, for example, can result in measured RNFL thickness that is lower than normal, according to the normative data included in instruments that make such measurements. This study demonstrates that amblyopia does not result in RNFL thinning, and when thinning is found, it should not be attributed to amblyopia. When RNFL thinning is seen in this setting, an alternative explanation such as glaucoma must be considered. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Amblyopia, Glaucoma Diagnosis

Print Tag: Refer to original journal article

Fuchs Iridocyclitis Often Misdiagnosed

A Cross-sectional and Longitudinal Study of Fuchs Uveitis Syndrome in Turkish Patients.

Tugal-Tutkun I, Güney-Tefekli E, et al: test

test Am J Ophthalmol 2009; 148 (October): 510-515

Iris heterochromia is often absent in Fuchs iridocyclitis, especially in individuals with heavy iris pigmentation, and is not a defining characteristic of the condition.

Objective: To describe the clinical characteristics of patients with Fuchs iridocyclitis.
Design: Retrospective, observational clinical case series.
Methods: This study was undertaken in a large tertiary ophthalmic referral center in Turkey where records were reviewed of all patients treated with a diagnosis of Fuchs iridocyclitis during a 12-year period. Demographic characteristics and clinical findings were recorded at the time of diagnosis. The previous diagnosis made prior to referral, if any, was also recorded. Follow-up evaluation was also documented to record visual outcomes and the development of secondary complications of uveitis.
Results: 172 patients with Fuchs iridocyclitis were included in the study. The mean age at the time of presentation was 29.5 ± 8.5 years. The male-to-female ratio was 1:1.3. The majority of cases were unilateral, with bilateral involvement being seen in 5.2% of patients. A previous diagnosis of Fuchs iridocyclitis was made in only 9% of subjects before referral. The most prominent clinical findings at the time of presentation were diffuse keratic precipitates, which were large and round in 75% of patients and fine/stellate in 25% of patients. Diffuse iris atrophy without heterochromia was seen in 49% of patients, while iris heterochromia was noted in 40%. Other common but not universally present findings included iris nodules in 32% of patients and cataract in 69%.
Conclusions: Fuchs iridocyclitis is commonly misdiagnosed at the time of initial onset, with heterochromia occurring in a minority of patients with a dark brown iris.
Reviewer's Comments: This case series took place in Turkey, where most patients have a thick, dark brown iris. Iris atrophy due to chronic inflammation can occur without visible heterochromia, as was seen in the majority of patients in this series. Since Fuchs iridocyclitis has been commonly associated with iris heterochromia, there is a misconception that this is a pathognomonic finding in this condition, which is not the case. (Reviewer-Scott D. Smith, MD, MPH).

Keywords: Uveitis

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