Intra-arterial fibrinolysis does not offer improved visual outcomes in comparison to conservative therapy for acute central retinal artery occlusion.

**Objective:** To evaluate the safety and efficacy of local intra-arterial fibrinolysis with tissue plasminogen activator (tPA) in the management of patients with central retinal artery occlusion.

**Design:** Prospective randomized multicenter clinical trial (the European Assessment Group for Lysis in the Eye study).

**Methods:** 9 centers in Austria and Germany recruited 84 patients with central retinal artery occlusion to participate in this clinical trial over a 5-year period. All patients had onset of symptoms of ≤20 hours, and were randomized to receive standard conservative therapy according to the traditional regimen used in this region, or local intra-arterial fibrinolysis. All patients received heparin, and conservative therapy included hemodilution and administration of intraocular pressure-reducing medications. Local intra-arterial fibrinolysis was performed using a super-selective catheter placed in the opthalmic artery, through which tPA was injected until fibrinolysis was observed. A maximum dose of 50 mg of tPA was given. One-month visual outcomes were used as the primary outcome measure. Secondary outcome measures included safety of each form of therapy.

**Results:** A significant improvement in visual acuity was seen in both groups. However, there was no significant difference in the pre- or post-treatment visual acuity between groups. In total, 60% of patients in each group developed improvement in visual acuity of at least 0.3 logMAR units. In contrast, complications were significantly more common in the intra-arterial fibrinolysis group, with 37% compared to 4% having a major or minor adverse event.

**Conclusions:** Based on similar visual outcomes and a higher rate of complications associated with intra-arterial fibrinolysis, this therapy is not recommended for acute central retinal artery occlusion.

**Reviewer's Comments:** Although intra-arterial fibrinolysis has been used for years to manage patients following acute cerebrovascular occlusion, complications and lack of efficacy appear to make it unsuitable for the management of patients with central retinal artery occlusion. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Retinal Arterial Occlusion, Intra-Arterial Fibrinolysis, Tissue Plasminogen Activator

Print Tag: Refer to original journal article
Patients with both ischemic and nonischemic central retinal vein occlusion are at increased risk for the development of neovascular glaucoma.

**Objective:** To describe the natural history of central retinal vein occlusion (CRVO).

**Design:** Systematic review of the medical literature and meta-analysis.

**Methods:** A systematic review of all English-language articles contained in the MEDLINE, EMBASE, Current Contents, and Cochrane Library databases up to November 13, 2008 were included. This was supplemented by a hand-searching review of references of articles published within the last 5 years. Two investigators individually identified relevant studies from these references containing data on the natural history of CRVO and clinical trials evaluating treatment for CRVO. Meta-analysis was performed in order to summarize the results from these studies.

**Results:** 5966 citations were retrieved, and 53 studies were reviewed. The total number of eyes included in the relevant studies was 3271. Baseline visual acuity was worse for patients with ischemic CRVO compared to those with nonischemic CRVO (20/200 or worse versus 20/40 or worse). Progressive loss of vision was noted in both groups, with a 1-year follow-up visual acuity tending to be 1 line worse in patients with nonischemic CRVO and 7 lines worse in patients with ischemic CRVO. Neovascular complications occurred in both groups, with neovascular glaucoma occurring more often in those with ischemic CRVO. However, nonischemic CRVO converted to the ischemic subtype in up to 35% of cases.

**Conclusions:** The natural history of CRVO is one of progressively decreasing visual acuity over time. The development of neovascular complications is associated with a worse visual outcome.

**Reviewer’s Comments:** Although neovascular complications are less common, and neovascular glaucoma more rare in patients with nonischemic than ischemic CRVO, all patients with retinal vein occlusion are at risk for the development of this severe complication and must be monitored over time with careful examination of the iris and gonioscopy. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Retinal Vein Occlusion

Print Tag: Refer to original journal article
Low Birth Weight Is Risk Factor for Infantile Cataract


Prakalapakorn SG, Rasmussen SA, et al:

Ophthalmology 2010; 117 (August): 1500-1505

Birth weight <1500 g is strongly associated with both unilateral and bilateral infantile cataracts, while birth weight of 1500 to 3000 g is associated with bilateral cataracts.

Objective: To identify risk factors for infantile cataracts.
Design: Case-control study.
Participants/Methods: 152 infants were identified from the National Birth Defects Prevention Study who were born from 2000 to 2004. Overall, 4205 control infants without birth defects were identified from population-based hospital birth records. Multivariate statistical analysis was performed to identify associations between a variety of risk factors and bilateral or unilateral infantile cataracts of unknown etiology.
Results: Very low birth weight (<1500 g) was strongly associated with both unilateral and bilateral cataracts (odds ratio [OR], 6.0 and 13.2, respectively). Low birth weight in the range of 1500 to 3000 g was only associated with bilateral cataracts (OR, 3.3). Primigravid women were more likely to give birth to a child with unilateral cataract (OR, 1.6). The data also suggested possible associations between maternal substance abuse during pregnancy and unilateral cataract, as well as urinary tract infection and aspirin use with bilateral cataract.
Conclusions: Very low birth weight (<1500 g) is strongly associated with both bilateral and unilateral cataracts, whereas low birth weight (1500 to 3000 g) is associated with bilateral cataracts.
Reviewer's Comments: This study confirms previous reports suggesting that low birth weight is a risk factor for congenital cataract. Other risk factors suggested by the data in this study require further evaluation to determine their role in development of this relatively common cause of vision loss in infants. This study also indicates the clear need for proper screening of low birth weight infants for congenital cataract in order to institute therapy at the earliest possible time to reduce the risk of permanent visual impairment due to amblyopia. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Congenital Cataract, Risk Factors

Print Tag: Refer to original journal article
When performing a YAG laser capsulotomy, the posterior capsule opening should be larger than the pupil diameter under darkened conditions.

**Objective:** To evaluate the correlation between posterior capsule opacification (PCO) and intraocular straylight.

**Design:** Prospective observational clinical study.

**Participants/Methods:** 41 patients with visually significant posterior capsule opacification following cataract extraction were enrolled in this clinical study. Measurement of visual acuity and intraocular straylight with the C-Quant straylight meter were performed before and after YAG laser posterior capsulotomy. Statistical analysis was performed to determine clinical factors associated with residual straylight following the procedure.

**Results:** A strong correlation was noted between both direct reflected light and retroillumination posterior capsule opacification scores noted on slit lamp examination. Visual acuity correlated only with retroillumination scores. Significant improvements in both visual acuity and straylight were noted following laser capsulotomy, although a wide range of variability in residual straylight was seen in patients with good visual acuity. Statistical analysis identified older patient age, longer axial length, use of a hydrophobic acrylic intraocular lens, and small capsulotomy size (smaller than the pupillary diameter) as factors contributing to residual intraocular straylight.

**Conclusions:** Intraocular straylight is useful in evaluating the reduction in visual function in patients with PCO. Small capsulotomy size is correlated with increased intraocular straylight and glare phenomena following laser capsulotomy.

**Reviewer's Comments:** The association between intraocular lens material and residual straylight was not explained by the authors, who suggested further evaluation of this subject to determine whether straylight is affected by intraocular lens design and/or material. The most important conclusion drawn from this study for the ophthalmologist to understand is that performance of a small posterior capsulotomy, particularly with the diameter of the capsular opening being smaller than the pupil diameter under darkened conditions, may lead to residual symptoms. Creation of a larger capsulotomy is recommended. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: YAG Laser Capsulotomy, Posterior Capsule Opacification, Straylight

Print Tag: Refer to original journal article
The use of >3 drops of topical steroid per day is associated with a higher risk of cataract in children with juvenile idiopathic arthritis-associated anterior uveitis.

**Objective:** To evaluate the risk of cataract development in patients with juvenile idiopathic arthritis (JIA)-associated uveitis treated with topical corticosteroids.

**Design:** Retrospective cohort study.

**Methods:** Medical records were reviewed of 75 patients with JIA-associated uveitis treated at a single academic uveitis clinic from 1984 to 2005. Demographic and clinical data were abstracted from the chart, and the primary outcome measure evaluated was the new onset of cataract. This was defined as either 1+ nuclear or cortical opacity or trace posterior subcapsular opacity not previously documented. Statistical analysis allowed the identification of risk factors for cataract development, including the dose-related effect of topical corticosteroids.

**Results:** Median follow-up was 4 years. The incidence of new-onset cataract was significantly greater in eyes treated with ≥4 drops of topical corticosteroid per day. Those eyes treated with lower doses of topical steroid had a relative risk of 0.13 in comparison to those treated with the higher-dose topical steroid. This association remained after adjustment of other potential confounding factors, including the severity of ocular inflammation. However, indicators of more severe inflammation, such as the presence of posterior synechia and more advanced disease at the time of presentation, were also associated with an increased risk of cataract.

**Conclusions:** A dose-related effect of topical corticosteroid use is associated with an increased risk of cataract formation in children with JIA-associated uveitis. This is true independent of the activity of uveitis or presence of posterior synechia.

**Reviewer's Comments:** This study demonstrates the importance not only of controlling inflammation in children with JIA-associated uveitis in order to avoid complications of cataract, band keratopathy, and cystoid macular edema, but also to minimize the use of topical steroids once the inflammation is controlled. Those children using ≥4 doses of topical steroid on an ongoing basis have a substantially higher risk of cataract formation. Minimization of the use of topical steroids to keep the inflammation under control is important, and consideration of the use of steroid-sparing treatment such as methotrexate in order to reduce the need for topical steroids is also important. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Uveitis, Cataract, Topical Corticosteroids

Print Tag: Refer to original journal article
The use of topical ketorolac or fluorometholone for 1 month prior to trabeculectomy appears to improve the outcome of this procedure.

**Objective:** To evaluate the efficacy of preoperative treatment with topical ketorolac or fluorometholone on clinical outcomes following trabeculectomy.

**Design:** Prospective randomized placebo-controlled clinical trial.

**Participants/Methods:** 61 patients with medically uncontrolled glaucoma scheduled for first-time trabeculectomy were randomly assigned to 1 of 3 study groups. The first group received topical ketorolac, dosed 4 times daily for 1 month prior to surgery. The second group received topical fluorometholone, and the third group received artificial tears as a placebo, with the same dosing schedule. Patients were examined at periodic intervals through 24 months following trabeculectomy and clinical outcomes were compared.

**Results:** All patients had a significant reduction in intraocular pressure following surgery. The mean preoperative intraocular pressure was similar at approximately 27 mm Hg and decreased similarly in all groups. However, the need for bleb needling was significantly greater in placebo patients than in those receiving either of the 2 anti-inflammatory drugs. In addition, those patients treated with fluorometholone had a significantly reduced need for topical glaucoma medications, and a statistically significantly better medication-free survival of their trabeculectomy.

**Conclusions:** The use of topical ketorolac or fluorometholone for 1 month prior to trabeculectomy is associated with improved clinical outcomes in terms of likelihood of postoperative needling and reduction of use of glaucoma medications.

**Reviewer’s Comments:** This study demonstrates that some improvement in clinical outcome can be achieved by reduction of preoperative inflammation with ketorolac or fluorometholone. Use of fluorometholone is, in particular, interesting to consider based on these results because of its effect on reduced need for bleb needling and reduced need for glaucoma medications. Since fluorometholone penetrates poorly into the anterior chamber and has little effect on preoperative intraocular pressure, this drug makes sense as a potential means of improving the results of trabeculectomy in a simple and noninvasive way. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Glaucoma Filtering Surgery, Preoperative Treatment, Outcomes

Print Tag: Refer to original journal article
Laser Iridoplasty Provides No Additional Benefit in Eyes With Primary Angle-Closure

Laser Peripheral Iridotomy With and Without Iridoplasty for Primary Angle-Closure Glaucoma: 1-Year Results of a Randomized Pilot Study.
Sun X, Liang YB, et al:
Am J Ophthalmol 2010; 150 (July): 68-73

Performance of laser iridoplasty after laser iridotomy should not be performed in all patients with angle-closure, but should be applied to selected cases with non-pupillary block mechanism of disease.

Objective: To compare the efficacy and safety of laser peripheral iridotomy with or without laser peripheral iridoplasty for the management of patients with primary angle-closure.

Design: Randomized controlled clinical trial.

Design/Methods: A consecutive series of patients aged >40 years with primary angle-closure with or without glaucomatous optic nerve damage who had at least 0.5 clock-hours of peripheral anterior synechiae were recruited for participation in this study. Patients were randomly assigned to receive laser iridotomy alone, or iridotomy plus iridoplasty, performed within 5 days after iridotomy. After laser treatment, patients were followed for 1 year to compare the final intraocular pressure, extended peripheral anterior synechiae, and need for glaucoma surgery.

Results: 77 patients were randomized to the iridotomy group, and 81 patients were randomized to the iridotomy plus iridoplasty group. No significant differences in baseline or 1-year follow-up intraocular pressure were seen between groups. In both groups, a significant and comparable reduction in intraocular pressure was seen. No differences in the requirement for glaucoma medications, need for glaucoma surgery, or visual function were seen between groups at the 1-year visit. There was, however, one greater clock-hour of reduction in peripheral anterior synechiae in the iridoplasty compared to the iridotomy group (P <0.001).

Conclusions: In eyes with primary angle-closure with peripheral anterior synechiae, performance of laser iridoplasty in conjunction with laser iridotomy provides no significant additional benefit.

Reviewer's Comments: This study indicates that the across-the-board use of laser iridotomy for all patients treated for primary angle-closure who have peripheral anterior synechiae is not necessary. Performance of laser iridotomy should be followed by repeat gonioscopy, and if a deepening of the anterior chamber angle occurs, then pupillary block can be inferred as the underlying cause of angle-closure. If persistent narrowing of the anterior chamber angle is present, then a non-pupillary block mechanism of angle-closure must be considered. This includes lens-induced glaucoma or plateau iris syndrome. Such patients should be considered for further treatment, including laser iridoplasty on a selected basis, or performance of lens extraction when appropriate to deepen the anterior chamber angle. Laser iridoplasty does have potential consequences, including cosmetic changes of the iris and may not permanently increase the angle width. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Angle-Closure Glaucoma, Laser Treatment

Print Tag: Refer to original journal article
Subconjunctival injection of mitomycin-C beneath a pterygium 1 month prior to excision results in a reduced rate of recurrence, similar to performance of a conjunctival autograft.

**Objective:** To evaluate the rate of recurrence of pterygium after surgical excision using 2 alternative therapeutic approaches: subconjunctival injection of mitomycin-C 1 month prior to bare scleral excision, and conjunctival rotational flap with intraoperative mitomycin-C use.

**Design:** Prospective randomized clinical trial.

**Design/Methods:** A consecutive series of 82 eyes of patients diagnosed with primary pterygium requiring surgical excision was enrolled in the study. One group was assigned to undergo subconjunctival injection of mitomycin-C 0.2 mg/mL in a volume of 0.1 mL 1 month before bare scleral excision. The other group underwent conjunctival autografting after excision of the lesion, with supplemental intraoperative application of mitomycin-C. One-year follow-up allowed the comparison of recurrence rates and the identification of any complications associated with surgery.

**Results:** At 1-year follow-up, there was no statistically significant difference in recurrence rate between the 2 groups (subconjunctival mitomycin-C = 0%, conjunctival autograft = 4.3%; \( P > 0.5 \)). No significant complications were associated with either surgical approach.

**Conclusions:** Subconjunctival injection of mitomycin-C 1 month before bare scleral excision of pterygium appears to be of comparable efficacy in preventing recurrence of pterygium with 1-year follow-up.

**Reviewer's Comments:** Bare scleral excision of a pterygium is a quick and simple surgical approach that has gone by the wayside due to the high rate of recurrence after surgery. The standard approach has become performance of a conjunctival autograft to cover the site of excision, which has been clearly demonstrated to reduce the rate of recurrence. This study found that subconjunctival injection of mitomycin-C 1 month prior to bare scleral pterygium excision can give a similar recurrence rate to the more complicated approach, and may offer a simpler method to provide good results in those patients requiring surgical intervention. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Pterygium, Subpterygeal Injection, Mitomycin C

Print Tag: Refer to original journal article
Oral CF101, an adenosine receptor agonist and anti-inflammatory, improves corneal staining and tear break-up times among patients with moderate to severe dry eye.

**Background:** Dry eye syndrome (DES) is a very prevalent disorder, which is partly inflammatory mediated. Artificial tears are useful for mild disease. Other treatments include topical corticosteroids and cyclosporine or oral tetracycline and omega-3 fatty acids; however, not all of these therapies are effective. CF101 is an adenosine receptor agonist (A3AR), which downregulates proteins involved in producing inflammatory mediators and autoreactive T cells.

**Objective:** To investigate the effect of oral CF101 on signs and symptoms of moderate to severe DES.

**Design:** Prospective multicentered randomized double-masked placebo-controlled phase 2 trial.

**Participants:** 68 patients with dry eye at 5 centers in Israel.

**Methods:** For inclusion, patients had to have an ocular symptom consistent with dry eye of at least ≥2 (scale: 0=none, 4=very severe), Schirmer test without anesthesia of <7 mm in 5 minutes, and corneal staining of ≥1 (scale: 0=none, 3=severe). Patients were forbidden to use any cosmetics or topical therapies other than preservative-free artificial tears (up to 8x daily). Exclusion criteria were history of Sjögren or Stevens Johnson syndrome, ocular herpes simplex infection, or contact lens use within 3 months. Other exclusion criteria included use of cyclosporine within 3 months, oral corticosteroids of more than the equivalent of prednisone 10 mg or any topical corticosteroids within 2 weeks, corneal scarring, anesthetic cornea, uncontrolled asthma, pregnancy, or lactation. Patients were randomized to 1 mg CF101 or placebo twice daily for 12 weeks. Successful treatment was defined as improvement of at least 25% in tear break-up time (TBUT), superficial punctate keratitis (SPK) score, or Schirmer score.

**Results:** 80 patients were enrolled (42 in CF101 group) and 68 (85%) completed 12-week follow-up. Two thirds of the patients were women and all were white. There were no baseline differences in TBUT, Schirmer, or SPK scores between groups. Corneal staining and TBUT were significantly improved for the CF101 group compared to placebo. There were no differences observed for Schirmer or dry eye symptom scores between groups. No serious adverse events were reported. Other adverse events (eg, headache, myalgias, constipation, or fatigue) did not differ between groups.

**Conclusions:** Oral CF101 showed improvement in corneal staining and TBUT compared to placebo among patients with moderate to severe dry eye.

**Reviewer's Comments:** We are always looking for new treatments for dry eye. It is a little disappointing that the subjective symptoms were not improved on CF101. As we all know, cyclosporine can take up to 6 months for an effect, so it may be that this trial just didn't follow patients long enough to see a difference. We will see how this drug fares in future phase 3 trials. (Reviewer-Michael S. Lee, MD).

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Keywords: Dry Eye, Treatment, Management, CF101

Print Tag: Refer to original journal article
Amantadine Can Reduce Endothelial Cell Density in Parkinson Patients

The Effect of Amantadine on Corneal Endothelium in Subjects With Parkinson's Disease.

Chang KC, Jeong JH, et al:

Ophthalmology 2010; 117 (June): 1214-1219

Amantadine is more likely to have an effect on corneal endothelial cells in a dose-dependent manner when used long-term.

**Background:** Amantadine is a drug often used in Parkinson disease and multiple sclerosis. Several case reports of toxic corneal edema from amantadine use have been published recently.

**Objective:** To evaluate the corneal endothelial cells of patients with Parkinson disease on amantadine.

**Design:** Observational cross-sectional case control study.

**Participants:** 169 patients taking amantadine and 169 controls.

**Methods:** Patients with Parkinson disease taking amantadine were enrolled. Exclusion criteria included history of ocular trauma, topical medication use, contact lens use, glaucoma, diabetes, or laser treatment. Age- and gender-matched controls were recruited from a cataract clinic. Evaluation included slit lamp examination, specular microscopy, and pachymetry. The amantadine patients were divided into 6 subgroups for analysis based on 2 parameters: total dose received or duration of therapy. The groups were as follows: group 1: <3000 mg, group 2: between 3000 and 8000 mg, group 3: between 8000 and 35,000 mg, group 4: <12 months, group 5: between 12 and 36 months, and group 6: between 36 and 96 months.

**Results:** There were 93 women and 76 men with a mean age of 59 years in each group. The overall average treatment duration was 29 months. There were no patients with corneal edema in either group. There was a significantly lower endothelial cell density (2660 vs 2780), lower hexagonality (57 vs 61), and higher coefficient of variation (36 vs 33) in the amantadine group compared to controls. Longer duration of treatment and higher total dose resulted in a much higher loss of endothelial cell density.

**Conclusions:** Amantadine has an adverse effect on corneal endothelial cells in a dose-dependent fashion.

**Reviewer's Comments:** In a patient with new onset, bilateral corneal edema, make sure you look at the medication list and see if the patient is on amantadine. I have seen 3 cases and 2 of them stopped the amantadine resulting in corneal clearing. Unfortunately, those patients had much lower final endothelial cell density than normal controls. This paper supports the notion that amantadine damages endothelial cells somehow but the mechanism is not well understood. (Reviewer-Michael S. Lee, MD).

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Keywords: Amantadine, Corneal Endothelium, Parkinson Disease

Print Tag: Refer to original journal article
Placing a vibrator on the forehead of a patient during administration of a periocular, local anesthetic into the eyelid improves the perception of pain compared to placebo.

**Background:** Many eyelid procedures require the use of local anesthetic injections. The injection itself can produce pain and anxiety.

**Objective:** To assess whether vibration on the forehead can reduce the pain of local anesthetic injection.

**Design:** Prospective, randomized controlled crossover clinical trial.

**Participants:** 80 patients undergoing eyelid surgery at a single center in Canada.

**Methods:** Patients aged >18 years undergoing a virgin bilateral levator resection or blepharoplasty under local anesthetic were included. A hand-held, battery-powered vibrator was placed 1 cm above the midbrow in the center of the forehead using light pressure and rotated clockwise in a 2-cm circle at 1 cycle per 2 seconds. The placebo included placing a powered-off vibrator in the appropriate location and turning on a second device nearby to mimic the sound of vibration. The vibrator was used for 1 eye and the placebo for the other side. The right side was always injected first but the order of vibration was randomized. The anesthesiologist gave the patient intravenous midazolam 5 to 10 minutes prior to the first injection. The patient was given an anesthetic eyedrop followed by 6 to 8 injections of Xylocaine 1% using a 30-gauge needle. Each patient rated pain on a 0 to 10 scale immediately after both sides were injected. The patient was also asked which side hurt more and if so, by how much.

**Results:** There were 58 women and 22 men with a mean age of 62 years. Only 14 received intravenous midazolam. The mean pain score for the vibrated side was 3.3 compared to 4.5 for the control side. Almost three fourths of patients felt the vibrated side was better. Of those, one third felt that it was much better. The vibrated side was worse than the placebo in almost one fourth of patients. The pain scores were equal in 4%.

**Conclusions:** Placing a vibrator along the glabella prior to a local anesthetic injection improves pain.

**Reviewer's Comments:** This may be from distraction or the vibration masking the effect of the pain. In either case, it is a reasonable consideration before giving periorcular injections. The authors list the cost of the vibrator at 20 dollars. They note that patients were informed that this tool has sexual connotations but that no patient was either embarrassed or expressed disapproval. (Reviewer-Michael S. Lee, MD).

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**Keywords:** Vibration, Vibrator, Anesthesia, Injection, Eyelid, Surgery

**Print Tag:** Refer to original journal article
In this study, almost all reported cases of calcification of silicone intraocular lenses occurred in patients with asteroid hyalosis.

**Objective:** To describe the association between asteroid hyalosis and the development of calcification of silicone intraocular lenses (IOLs).

**Design:** Retrospective clinical case series.

**Methods:** A consecutive series of 16 cases of explantation of silicone IOLs due to the development of calcification was included in this study. Clinical data for each patient were obtained from the explanting surgeon in order to determine demographic and clinical information. All IOLs were subjected to gross and light microscopic analysis, and selected lenses underwent additional testing including electron microscopy to ascertain the nature of the calcification.

**Results:** The 16 silicone IOLs were of 8 different designs made from different silicone materials. The mean time from implantation to explantation was 9.2 years. Neodymium:yttrium-aluminum-garnet (Nd:YAG) laser treatment had partially removed calcium deposits in several cases, but follow-up evaluation demonstrated recurrence of the calcification. Deposits were on the posterior surface of the IOL in all cases. The presence of asteroid hyalosis on clinical examination was confirmed in 13 of 16 cases.

**Conclusions:** Asteroid hyalosis is associated with the development of calcification of the posterior surface of silicone IOLs.

**Reviewer's Comments:** Calcification of silicone IOLs is a relatively rare complication of cataract surgery. This study highlights the fact that asteroid hyalosis is an indication that a patient is prone to the development of intraocular calcific deposits that may affect a silicone IOL. Calcification in hydrophilic acrylic IOLs has been reported, but has not been found in association with asteroid hyalosis. Since this phenomenon has not been described with IOLs made of other materials including PMMA or acrylic, surgeons who use silicone IOLs on a routine basis may choose to use an alternative lens when performing cataract surgery in patients with asteroid hyalosis. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Asteroid Hyalosis, IOL Design, Complications of Cataract Surgery

Print Tag: Refer to original journal article
The Hoffer Q formula appears to be less likely to result in undercorrection than other power calculation formulas when selecting an intraocular lens for pediatric cataract surgery.

**Objective:** To assess the accuracy of intraocular lens (IOL) power calculation formulas (SRK II, SRK/T, Holladay 1, and Hoffer Q) in children undergoing cataract surgery.

**Design:** Retrospective interventional clinical case series.

**Methods:** Medical records were reviewed of a consecutive series of 135 eyes of 96 children who underwent cataract extraction with posterior chamber IOL implantation. All patients were aged <18 years at the time of surgery. All surgical procedures were performed by a single surgeon over a 10-year period. Axial length, keratometry, and manufacturers' recommended A constants were used to calculate the expected spherical equivalent refractive error following surgery using each of the 4 formulas. The primary outcome measure was the prediction error (PE), the difference between expected and measured postoperative spherical equivalent refractive error. Refractive error measured in each patient between 4 and 8 weeks after surgery was used as the measured refractive outcome.

**Results:** The mean age of patients at the time of surgery was 6.4 years. The mean absolute PE was 1.1 D for the SRK II formula, 0.84 D for the SRK/T formula, and 0.76 D for both the Holladay 1 and Hoffer Q formulas. There was a trend toward greater PE in younger children aged <2 years at the time of surgery. In addition, shorter axial length and steeper keratometry values were associated with greater values of PE. Although the absolute PE was similar between the Holladay 1 and Hoffer Q formulas, fewer patients with undercorrection and residual hypermetropia were seen with the Hoffer Q formula, leading the authors to conclude that the Hoffer Q offered superior clinical outcomes.

**Conclusions:** The Hoffer Q formula appears to offer the best prediction of IOL power for children undergoing cataract surgery.

**Reviewer's Comments:** The Hoffer Q formula has also been found to provide more accurate IOL power calculation in adult patients with shorter axial length. Consideration of the results of this study may help to provide better refractive outcomes in children undergoing cataract surgery. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Intraocular Lens, Power Calculation Formulas, Cataract Surgery

Print Tag: Refer to original journal article
Gradual Change in Phakic ICL Vault Associated With Anterior Subcapsular Cataract

**Long-Term Changes in Posterior Chamber Phakic Intraocular Collamer Lens Vaulting in Myopic Patients.**

Schmidinger G, Lackner B, et al:

Ophthalmology 2010; 117 (August): 1506-1511

A gradual reduction in the space between posterior chamber phakic intraocular Collamer lens and the crystalline lens can lead to the onset of anterior subcapsular cataract.

**Objective:** To evaluate the central and midperipheral vaulting of the posterior chamber phakic intraocular Collamer lens (ICL) in eyes with moderate to high myopia.

**Design:** Retrospective analysis of clinical data collected prospectively.

**Methods:** 84 eyes treated with the ICL for myopia were followed for a mean of 74 months after surgery. Anterior segment optical coherence tomography (Visante, Carl Zeiss Meditec) was used to evaluate the central and midperipheral vaulting and measures of clearance between the ICL and the crystalline lens. Follow-up evaluation included repeat measure of this parameter to determine the stability of the ICL position relative to the crystalline lens over time.

**Results:** Over time, a continuous and gradual decline in the mean central vaulting was observed. At the 10-year follow-up point, the mean central vaulting decreased from a baseline of 466 μm to 184 μm. The mean central vaulting was significantly lower in those eyes that had midperipheral contact between the ICL and the crystalline lens. ICL removal with cataract extraction due to anterior subcapsular lens opacity was required in 17% of patients with inadequate vaulting of the ICL.

**Conclusions:** Enlargement of the crystalline lens results in gradual but progressive loss of vaulting of the ICL over time. This can lead to anterior subcapsular cataract requiring ICL removal and cataract surgery.

**Reviewer's Comments:** Placement of the ICL has been a refractive surgical option for patients with higher degrees of myopia who are not good candidates for corneal refractive surgery. This study should remind us that long-term outcomes must be assessed in order to understand the implications of medical interventions. The late development of cataract is a significant potential problem following ICL implantation. The gradual but continuous reduction in clearance between the ICL and the crystalline lens observed in this study demonstrates that eventual lens opacification is likely to occur in many patients. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Refractive Surgery, Complications, Cataract

Print Tag: Refer to original journal article
Objective: To assess the outcome of cataract surgery in monocular patients, and to determine whether the visual status of the worse eye influences this outcome.  

Design: Retrospective interventional clinical case series.  

Methods: Medical records were reviewed of a consecutive series of patients who underwent cataract surgery who had poor vision or no vision in the fellow eye. Patients were defined as functionally monocular if the vision in the fellow eye was 20/200 or worse. Patients were categorized as having either limited vision or no vision (no light perception) in the fellow eye. Patients were also classified on the basis of the types of ocular or systemic medical comorbidities including medical and surgical complications. The influence of these comorbidities on the outcome was also evaluated.  

Results: Visual outcomes tended to be better in patients with no vision in the fellow eye at the time of cataract surgery. Decreased visual acuity at the time of final follow-up in the better seeing eye was reduced in 6.3% of patients with no vision in the fellow eye compared to 19.2% of patients with poor vision in the fellow eye. Patients with poor vision tended to have more medical comorbidities underlying the loss of vision in the fellow eye, including glaucoma, uveitis, and diabetic retinopathy. Consequently, these conditions were more likely to develop following cataract surgery in the better seeing eye, resulting in a worse visual outcome in a higher proportion of cases.  

Conclusions: The cause of vision loss in the fellow eye has significant implications on the outcome of cataract surgery in the better seeing eye of functionally monocular patients.  

Reviewer's Comments: The cause of vision loss in the fellow eye of a monocular patient considered for cataract surgery can influence the anticipated outcome in the better seeing eye. For example, patients who have lost vision in one eye due to diabetes or a systemic disease causing uveitis may develop these conditions in the better seeing eye, ultimately affecting the visual outcome. On the other hand, monocular patients following ocular trauma are not at increased risk of future vision loss in the better seeing eye. Since more patients with systemic medical conditions causing the loss of vision in the worse eye had at least some remaining vision, clinical outcomes following cataract surgery in monocular patients tended to be better when the worse eye had no light perception. (Reviewer-Scott D. Smith, MD, MPH).  

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Keywords: Cataract Surgery, Monocular Patients, Complications  

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Sleeping in a Head-Up Position Decreases IOP in Patients With Glaucoma

Effect of Sleeping in a Head-Up Position on Intraocular Pressure in Patients With Glaucoma.
Buys YM, Alasbali T, et al:
Ophthalmology 2010; 117 (July): 1348-1351

Sleeping in a 30° head-up position can decrease intraocular pressure in patients with glaucoma by ≥20%. However, the benefit of this maneuver on reducing the risk of glaucoma progression is unknown.

**Objective:** To investigate the effect of body posture on intraocular pressure (IOP) during sleep in patients with glaucoma.

**Design:** Prospective nonrandomized comparative case series.

**Participants/Methods:** 17 patients with open-angle glaucoma participated in the study. Each patient had findings of a new optic disk hemorrhage in spite of stable IOP. Each subject was evaluated in a sleep laboratory on 2 separate nights. The first night, patients were asked to lie flat in bed through the night, during which measurement of IOP took place every 2 hours with the patient maintaining a reclined position during measurement. Measurement of IOP was also performed 4 hours before and after sleep with the patient in a sitting position. On the second night, the same series of measurements was made, but with the patient sleeping with the head of the bed elevated 30°. Blood pressure and ocular perfusion pressure were also measured during both nights of evaluation.

**Results:** During the awake period with measurements in the sitting position, there was no significant difference in IOP between the first and second nights of evaluation. During the sleeping period with measurements in a reclined position, a significant reduction in IOP was seen with the patient in the head-up position. A lower IOP value was observed in 94% of patients, with a reduction in IOP of at least 20% in 35% of patients. No differences in measured blood pressure or ocular perfusion pressure were seen.

**Conclusions:** Reduction in IOP is seen in most patients with glaucoma when a head-up position is maintained during sleep.

**Reviewer's Comments:** It must be emphasized that no clinical studies have been performed to determine whether sleeping in a head-up position reduces the risk of glaucoma progression. It is possible that other factors, such as alteration of ocular blood flow, may also be influenced by body position during sleep that may have a deleterious effect on glaucoma. Further investigation of these issues is required before glaucoma patients should be advised with regard to their sleeping habits. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Glaucoma Pathophysiology, Body Posture, Intraocular Pressure, Sleep

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Results of SWAP Affected by Yellow-Tinted IOLs

Effect of Yellow-Tinted Intraocular Lenses on Short-Wavelength Automated Perimetry.
Jang SY, Ohn YH, Kim SW:

The sensitivity of short-wavelength automated perimetry visual field testing is reduced by yellow-tinted intraocular lenses and must be taken into account when interpreting the results of the test.

Objective: To assess the affect of yellow-tinted intraocular lenses (IOLs) on the results of short-wavelength automated perimetry (SWAP).
Design: Cross-sectional observational clinical study.
Participants/Methods: 22 patients who underwent bilateral cataract surgery with posterior chamber IOL implantation were recruited to participate in this study. Eligible patients had received a yellow-tinted IOL (AcrySof SN60AT or SN60WF; Alcon) in one eye and a transparent IOL (AcrySof SA60AT) in the other eye. All patients underwent standard automated perimetry (SAP) and SWAP testing. Comparison between the results of SAP and SWAP were made between eyes in each of the study subjects.
Results: No statistically significant difference in the results of SAP was seen between eyes with yellow-tinted IOLs and those with transparent IOLs. For example, the mean deviation in eyes with tinted IOLs was -3.21 dB compared to -3.10 dB in eyes with transparent IOLs. There was, however, a significant difference in the results of SWAP as a function of the type of IOL. The mean deviation in eyes with yellow-tinted IOLs was -6.54 dB compared to -4.93 dB in eyes with transparent IOLs ($P=0.03$).
Conclusions: The sensitivity of eyes with yellow-tinted IOLs to the test stimuli presented in SWAP is decreased compared to eyes with transparent IOLs. This reduced sensitivity may result in confounding SWAP test results in patients with this type of IOL.
Reviewer's Comments: SWAP, or blue-on-yellow automated perimetry, has been shown to be more sensitive in the detection of early glaucomatous visual field loss than SAP. However, false-positive test results have been shown to be a problem in interpreting SWAP results. Cataract, for example, has been shown to confound the results of SWAP by causing a reduction in sensitivity to the test stimuli. This study demonstrates that yellow-tinted IOLs have been increasingly used for their potential to improve contrast sensitivity under certain lighting conditions, and also to possibly reduce the risk of high-energy visible light energy causing retinal damage. When a patient has a yellow-tinted IOL in place, SWAP results are prone to misinterpretation, suggesting that other visual field tests should be employed to detect glaucoma. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Visual Field Testing, Intraocular Lens Design, Short-Wavelength Automated Perimetry

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Corneal Neovascularization Increases Risk of Failure of PK

Corneal Neovascularization as a Risk Factor for Graft Failure and Rejection After Keratoplasty: An Evidence-Based Meta-Analysis.

Bachmann B, et al:

Ophthalmology 2010; 117 (July): 1300-1305

Pretreatment of corneas with neovascularization using vascular endothelial growth factor inhibitors may reduce the risk of subsequent failure of penetrating keratoplasty.

**Objective:** To evaluate the effect of corneal neovascularization on graft survival in patients undergoing penetrating keratoplasty (PK).

**Design:** Meta-analysis of published studies in the medical literature.

**Methods:** Electronic databases of the medical literature were searched to identify published studies investigating the success of penetrating keratoplasty. Standardized and accepted methods for developing search criteria and for conducting a meta-analysis were used to pool the data from available studies. Data from 19 studies evaluating 24,944 PK procedures were included in the analysis. Evaluation of the extent of corneal neovascularization and its effect on graft survival was performed.

**Results:** A significant association was seen between the presence of pathologic corneal neovascularization and an increased risk of graft failure. The pooled odds ratio for graft failure seen in association with this factor was 1.32 (95% confidence interval [CI], 1.15 to 1.49). The pooled odds ratio for the development of graft rejection was 2.07 (95% CI, 0.98 to 3.15). There was also evidence that the extent of corneal neovascularization influenced the risk, with a higher risk associated with each additional quadrant of the cornea being affected.

**Conclusions:** Graft failure and rejection following PK are more likely to occur in corneas affected by corneal neovascularization prior to surgery.

**Reviewer's Comments:** This meta-analysis confirms the results of previous work linking corneal neovascularization to graft rejection and failure. These findings offer support for the concept of reducing preoperative corneal neovascularization prior to surgery in order to improve the prospects of subsequent PK. This could theoretically be accomplished with the use of vascular endothelial growth factor inhibitors to induce regression of neovascularization prior to surgery to prepare the cornea in advance. This concept should be tested with prospective clinical studies to evaluate its efficacy. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Keratoplasty

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In patients with glaucoma who have visual field loss in only 1 eye, frequency-doubling technology can often reveal early visual field loss in the fellow eye.

**Objective:** To evaluate the ability of frequency-doubling technology (FDT) perimetry to detect early visual field loss in patients with primary open-angle glaucoma (POAG) who have unilateral visual field loss by standard automated perimetry (SAP).

**Design:** Prospective cohort study.

**Participants/Methods:** 68 patients with POAG who had visual field defects by SAP in only 1 eye were enrolled in this study. The perimetrically normal eye was evaluated with FDT using the N-30 threshold program. Follow-up testing with SAP was performed periodically for 3 subsequent years. Presence of a defect by FDT was compared with the subsequent probability of conversion to a visual field defect on SAP to determine its ability to identify those patients who were destined to show progression.

**Results:** Abnormal results on FDT were present in 65% of patients. None of the eyes that had a normal result on FDT developed a defect on SAP during the 3-year follow-up period. In contrast, 51% of eyes with a defect on FDT at baseline went on to show evidence of visual field loss by SAP during follow-up. Although there were no differences in intraocular pressure between those eyes with FDT defects that did and did not convert to an abnormal SAP, they were more likely to have an enlarged optic cup or a denser defect on FDT than were those that did not convert.

**Conclusions:** Early visual field loss can be detected with greater sensitivity by FDT than by SAP, and it is often present in patients with clinically unilateral POAG.

**Reviewer's Comments:** POAG is a bilateral disease, but it is often highly asymmetric. Early detection of visual field loss in the fellow eye when unilateral field loss is present is important to ensure that the patient is receiving appropriate therapy in both eyes. This study suggests, by detecting visual field defects using a more sensitive instrument than SAP, that the fellow eye with a normal visual field should be treated in patients with unilateral visual field defects, as it often has visual field loss, just not to the threshold of sensitivity of detection with SAP. (Reviewer-Scott D. Smith, MD, MPH).
**Objective:** To evaluate the relationship between the duration from initial examination to surgery on the outcome in patients with fovea-sparing rhegmatogenous retinal detachment (RRD).

**Design:** Retrospective, interventional clinical case series.

**Methods:** Medical records were reviewed of consecutive patients with fovea-sparing RRD who underwent surgical management by a single vitreoretinal specialist at a tertiary referral center. All patients were managed with a scleral buckle. Patients who required pars plana vitrectomy were excluded from study. Analysis of the visual outcome as a function of the length of time between presentation and surgery was performed. In addition, the progression to fovea-off status following initial diagnosis was also evaluated.

**Results:** Symptoms lasting at least 7 days were present in 55% of patients. There were 33% of patients who had a detachment that extended within the macular arcade vessels. Of patients, 56% underwent surgery within 24 hours of diagnosis, and 85% within 3 days. Of 199 patients included in the study, 1 progressed to fovea-off status 4 days after diagnosis. The anatomical success of retinal reattachment was 99.5%, with 1 patient refusing reoperation.

**Conclusions:** Progression to fovea-off status is rare in patients with fovea-sparing RRD when operated within 4 days of diagnosis. This series suggests a selectively urgent, as opposed to emergent, surgical approach is safe for management of these patients.

**Reviewer's Comments:** Allowing the patient to attend to personal matters overnight, and allowing the surgeon the opportunity to approach the procedure without disrupting his/her other work schedule has numerous potential advantages. This study demonstrates that a short delay in performing surgery for fovea-sparing RRD can be medically appropriate, and it may improve the process of health care delivery. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Fovea-Sparing Retinal Detachment, Outcomes

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The ophthalmic artery of children with retinoblastoma can be safely cannulated, allowing infusion of high concentrations of chemotherapeutic drugs with low overall dosage levels.

**Objective:** To report the safety and efficacy of selective administration of chemotherapy through the ophthalmic artery in children with retinoblastoma.

**Design:** Prospective institutional review board-approved clinical trial.

**Participants/Methods:** 23 children with newly diagnosed retinoblastoma (28 eyes) were included in the study. Mean age of children enrolled was 22 months (range, 3 to 88 months). Of enrolled eyes, 25 had Reese-Ellsworth Classification V tumors at the time of diagnosis. Cannulation of 1 or both ophthalmic arteries through a femoral arterial approach was performed. Selective administration of chemotherapy drugs was given through the ophthalmic artery microcatheter. Patients underwent 1 to 6 sessions of treatment on an outpatient basis. Patients with more advanced cases were treated with a multidrug regimen. Follow-up evaluation took place 3 to 33 months after completion of therapy.

**Results:** 1 eye required enucleation for failure of control of disease through chemotherapy. No eye was enucleated as a result of complications of therapy. The only adverse reactions were transient lid edema, forehead hyperemia, and loss of nasal eyelashes. The 2-year success of therapy was 89%. No other significant complications of therapy were observed.

**Conclusions:** Selective chemotherapy through an ophthalmic artery cannula shows promise as a new approach to management of retinoblastoma in children.

**Reviewer’s Comments:** This study describes a new approach to management of retinoblastoma that may reduce the need for enucleation and decrease the local morbidity related to other traditional types of therapy such as external beam radiation. The low overall dosage levels of chemotherapy drugs result in low systemic toxicity and can be given safely on an outpatient basis with repeated doses. The 3-year follow-up results show great promise for this approach to management of retinoblastoma in children. (Reviewer-Scott D. Smith, MD, MPH).

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Keywords: Retinoblastoma, Chemotherapy

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