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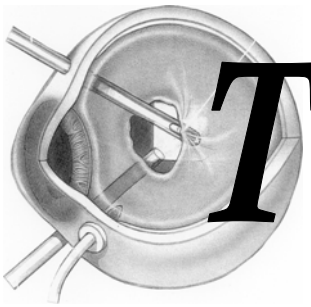

The Light Pipe

The newsletter of Georgia Retina, P.C.

Indocyanine Green Staining of Intraocular Tissues As an Aid in Vitrectomy Surgery

ICG dye was originally used for calculations of cardiac output. In ophthalmology it has been used as an intravenous contrast agent for angiography of the choroidal circulation. More recently ICG has been used as a vital stain to highlight the anterior lens capsule, to facilitate capsulotomy in patients with mature cataracts.

In vitreoretinal surgery, many maneuvers involve the identification and separation of extremely thin, transparent and barely visible tissues. ICG dye stains the internal limiting membrane (ILM) a distinct light green color. This greatly facilitates peeling of the ILM, which is sometimes required for successful macular hole surgery. It remains controversial as to whether it is necessary at all, to peel

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A Novel Approach to Treat Choroidal Melanoma

Investigations by Drs. Jerry and Carol Shields at the Wills Eye Hospital, have demonstrated the diode laser (810 nm) to be an effective tool to manage choroidal melanoma. Malignant melanoma of the uvea is the most common primary intraocular malignancy. Historically, patients with lesions suspected to be choroidal melanomas underwent enucleation. Consequently, some eyes, by necessity, were enucleated that did not have melanoma, and paradoxically some patients died of metastatic melanoma despite enucleation. Today, vitreoretinal specialists usually are consulted to evaluate and manage these patients. While enucleation is still utilized for visually compromising large and extra large tumors, there are many more treatment options. Methods of management are usually influenced by the size, extent, location, activity, status of the fellow eye, age, general health, and psychological make up of the patient.

Therapies include periodic observation for suspicious small tumors, or surgical approaches: photocoagulation, radioactive plaques or charged particle radiation, and local resection. Conventional photocoagulation treatment of melanoma has never been particularly popular in the United States, but had been a popular treatment option in Europe. Episcleral brachytherapy has essentially supplanted the use of argon laser photocoagulation in the United States and Europe. While radiotherapy has a number of serious side effects, including radiation retinopathy or papillopathy, venous occlusive disease, and vitreous hemorrhage, it is the favored method because it is more effective in eradicating the tumor than conventional photocoagulation. Charged particle radiation has the same side effects as radiation therapy, but may also have a higher incidence of neovascular glaucoma and is only performed at a few centers throughout the country. However, in the past five years, TTT (transpupillary thermotherapy) has become a popular man-

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Georgia Retina Welcomes Haris I. Amin, M.D.

Dr. Amin, a board-certified ophthalmologist, grew up on Long Island and received his medical degree from the State University of New York in Syracuse. After completing his residency in ophthalmology, he served as a fellow with Orbis International, visiting such diverse countries as Cuba, the Sudan and China.

Dr. Amin joined the vitreoretinal fellowship program at the California Pacific Medical Center, directed by Dr. Everett Ai and was invited to teach at the Stanford Ophthalmology Course and at the American Academy of Ophthalmology. Dr. Amin has worked in private practice in the Chicago area where he was an Assistant Clinical Professor at the University of Illinois. He will be seeing patients primarily in the Decatur, Marietta and Northside offices.

Practice News…

Georgia Retina continues to change almost daily, with new personnel, equipment, expanding office space, and novel treatments for many diseases.

We are very pleased to welcome our newest physician, Dr. Haris Amin, whose excellent credentials appear elsewhere in this issue. He and his wife and daughter are enjoying the mild Atlanta winter after two years in central Illinois. Some of you may already have met Dr. Amin at our Retinal Pearls meeting.

Photodynamic therapy (PDT) with Visudyne, and transpupillary thermotherapy (TTT) have been interesting additions to our armamentarium for fighting ARMD and other causes of choroidal neovascularization. While neither treatment is a panacea, many patients are much happier with stabilized vision and less central scotoma.

TTT can also be used for treatment of relatively flat choroidal malignant melanomas. Although there are no long-term studies, the early clinical success of this modality has been remarkable.

Our annual Retinal Pearls seminars have been very well attended, and we would like to thank you for supporting our academic efforts. We really enjoy the intellectual interplay at those meetings, and hope you find the information valuable in your day-to-day practice.

Patients in our clinical studies, involving limited foveal translocation, TTT for ARMD, and retinal branch vein sheathotomy for BRVO with severe visual loss continue to be monitored. These new modalities stimulate widespread interest in the vitreoretinal community.

This year the staff of Georgia Retina presented a most touching gift to the physicians at the annual holiday season party. While we certainly have no expectation of a gift at all, one might have thought that the envelope would have contained a gift certificate of some sort. Instead, we were pleased to find that our staff members had contributed a check to the recently formed Georgia Retina Foundation. We were deeply moved by their generosity which will help to provide care for those in need, and further research into vitreoretinal diseases.

The physicians and staff of Georgia Retina sincerely appreciate the support of the doctors in our community. We hope to exceed the standards you set for us.

Our Physicians

Michael S. Jacobson, M.D.
Scott I. Lampert, M.D.
Jay B. Stallman, M.D.
Haris I. Amin, M.D.

THE DIAGNOSIS AND MANAGEMENT OF NEURORETINITIS

A 52 year old female presented complaining of unilateral vision loss of one week duration. She had been febrile to 103 degrees and had an elevated white count. She had count fingers vision in her left eye and her fundus exam showed optic nerve edema with several areas of focal retinitis. A macular star figure developed later.

This is a typical presentation of a patient with neuroretinitis. Most cases are unilateral but 1/3 of cases may be bilateral. Rarely, retrobulbar pain, pain associated with eye movement or headache may occur. An antecedent or concurrent viral illness may accompany the visual loss in up to 50% of patients. Visual field testing shows defects consistent with an optic neuropathy. If the process is unilateral, an afferent pupillary defect will be present.

Diffuse optic disc swelling is the first manifestation in neuroretinitis. This may be accompanied by nerve fiber layer hemorrhages on the disc and around the peripapillary area. The swelling is associated with exudation from the disc capillaries. The fluid leaks from the disc, through the outer plexiform layer in the peripapillary retina and into Henle's layer producing the macular star. The hard exudate which forms the star appears as fluid is reabsorbed. Consequently, it may appear a few weeks after onset of disc swelling.

A vitritis often accompanies the neuroretinitis. An iritis, perivasculitis, chorioretinitis, and scleritis may also accompany neuroretinitis. Branch or central vascular occlusions may also occur and are due to areas of retinitis. The retinitis resolves after several weeks. Multiple areas of retinitis may point to an infectious etiology.

Most cases or neuroretinitis are idiopathic. They are often preceded by a viral flu like illness and often thought to be caused by a virus or an immune mediated cross reaction to unknown antigen. However, there are important noninfectious and infectious causes.

A cerebral arteriovenous malformation has been reported to cause a picture of bilateral neuroretinitis. The fact that elevated intraocular pressure can cause a picture of neuroretinitis needs to be kept in mind. Idiopathic intracranial hypertension can also cause a similar picture.

Vascular disorders have also been reported to cause neuroretinitis. Systemic hypertension with acute elevation may be responsible for cases. Ischemic optic neuropathy can also present as a neuroretinitis.

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Silicone Oil as a Vitreous Substitute

Liquid silicone oil (polydimethylsiloxane) is a polymer made of repetitive [-Si – O -] units. It was originally used in early vitreous surgery to unroll retinal flaps and immobilize the retina to allow removal of preretinal membranes. However, with the advent of heavy perfluorocarbon liquids, bimanual techniques, and wide angle viewing systems, it is rarely used intraoperatively for this purpose.

Silicone liquid is being utilized more frequently for long-term or even permanent support in complex retinal detachments. It is well tolerated, and the 5000 centistoke formulation most commonly used today appears to have fewer complications than older formulations. This may be due to less emulsification (secondary to higher viscosity) or higher levels of purity.

Retinal detachments secondary to CMV retinitis are virtually impossible to repair without permanent tamponade, because extensive retinal atrophy causes recurrent detachments. Vitraserts (gancyclovir implants) can be used with silicone oil in the eye. Acute retinal necrosis secondary to

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Vitrectomy Course at the Academy

Dr. Stallman was the senior instructor for a skills transfer course at the American Academy of Ophthalmology meeting in Dallas this past November. The course was entitled "Vitrectomy Techniques Using the Indirect Opththalmoscope", and included a wet lab.

These methods are helpful tools for the advanced vitreoretinal surgeon, and have special applicability for international settings, where wide angle visualization systems are not available.

The course was attended by participants from at least six countries and will be offered again at this year's Academy.

Dr. Lampert was a co-instructor, as were retinal specialists Dr. Jeffrey Gross from South Carolina and Dr. Dana Deupree from Florida.

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Treponema pallidum, the etiologic agent in syphillis, can cause neuroretinitis. These cases should be treated with intravenous, high dose penicillin as intramuscular treatment may be inadequate. Another spirochete, *Borrelia burgdorferi*, is the etiologic agent in Lyme disease. Stage 2 disease can be associated with neuroretinitis. Cephalosporins are the preferred treatment.

Among bacteria, *Bartonella henselae* is the most important cause of neuroretinitis. The etiologic agent of cat-scratch disease, *B. henselae* usually causes a regional lymphadenopathy, fevers and chills caused by a cat bite or scratch or handling objects that have come in contact with cats (especially kittens). Cat-scratch neuroretinitis can be associated with a choroiditis, optic nerve mass, uveitis, iritis and branch or central retinal artery occlusions. Focal white retinal lesions can occur anywhere but have a predilection for arteries. The lesions resolve over weeks to months and usually leave no sequelae. Although the disease is self limited with a good prognosis, treatment can hasten visual recovery. Doxycycline or ciprofloxacin may be used.

Parasitic causes of neuroretinitis include *Toxoplasma gondii*, *Toxocara canis, Alaria mesocercaria,* and *Baylisascaris procyonis*. *T. canis, A. mesocercaria* and *B. procyonis* can all cause diffuse unilateral subacute neuroretinitis (DUSN). Alaria may contaminate frog legs and Baylisascaris is found in raccoons. The damage seen in DUSN is due to worm byproducts as well as a toxic reaction throughout the entire retina. Consequently, vision is affected, the ERG is blunted and optic atrophy ensues as ganglion cells are damaged. A search for the worm should be directed towards areas of retinitis. Treatment can be rendered with laser or removal by vitreoretinal techniques. Laser treatment does not lead to excess inflammation . Medical treatment with thiabendazole or diethylcarbamazine has only been successful when there is moderate to severe vitritis.

Although many cases of neuroretinitis will have no definable etiology, it is important to exclude treatable diseases. Any suspicion of increased intracranial pressure should be evaluated with at least a cranial CT or MRI looking for signs of increased intracranial pressure or vascular anomalies. Vascular diseases like hypertension are easily screened for while more complicated diagnosis such as polyarteritis nodosa may need to be referred. A visual field can be obtained to evaluate anterior ischemic optic neuropathy.

In all cases an erythrocyte sedimentation rate, rapid plasma reagin, fluorescent treponemal antibody absorption, Lyme titer (and/or ELISA), *Bartonella* serology, *Toxoplasm*a titers and *Toxocara* titers should be obtained. This panel will test for most inflammatory disease (especially an arteritic AION due to temporal arteritis) and infectious disease. A PPD may be added if tuberculosis is suspected. There are no generally available serologic tests for either *Alaria* or *Baylisascaris*.

If an etiologic agent is found, appropriate therapy should be initiated. Steroids have been used in idiopathic cases but there is no clear benefit. Most cases will be idiopathic and can be followed as the natural course is fairly benign. The optic nerve swelling and subretinal fluid tend to resolve over two to three months. The macular star starts to diminish after one month but may last for up to one year. Depending on etiology, optic nerve atrophy and pigmentary changes may evolve. Most studies indicate that severe visual loss (20/400 or worse) is in the range of 3-5%. Most eyes will regain 20/50 or better within a few months.

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the ILM, but some authors have reported an increased success rate with this method. We find it most useful on those occasional re-operations, and in cases where there appears to be a posterior vitreous detachment (PVD) pre-operatively. The ILM is otherwise virtually invisible in most cases, and is technically difficult to peel. The peeling can be accomplished without dye, but often with some degree of trauma to the retinal surface. The ICG makes it highly reproducible, much faster, less traumatic and more predictable. Alternate methods utilize a special viscodissection cannula to allow viscous delamination of the ILM.

It may be also useful to peel the ILM in cases of taut posterior hyaloid syndrome causing chronic macular edema in diabetic retinopathy. ICG usually does not stain epiretinal membranes, but may highlight them by the absence of staining of the ILM, which they cover. This "negative staining" may make the full extent of an epiretinal membrane easier to appreciate, and may help to ensure that peeling is complete. This provides additional confirmation that the cortical vitreous has been separated.

The procedure is as follows: The ICG dye powder is reconstituted with one cc of the diluent provided with the dye. This concentrated solution is added to 4 cc of BSS. This should produce a concentration of 5 mg per ml. A vial of the dye has a shelf life of about 6 hours, after which it should be discarded. This one vial can be used for several consecutive cases. The mixture is then aspirated into a TB syringe and is injected over the retinal surface using a soft tipped cannula. The solution is left in place for less than one minute, then is aspirated from the eye. In order to reduce or prevent contact with the posterior lens capsule, a partial (about 50%) air/fluid exchange is performed so that the dye is dispersed in fluid separated from the lens. As the dye is removed from the eye, so is the air, and fluid infusion resumed, re-filling the eye with fluid. The peeling process is begun using a Tano diamond dusted membrane scratcher (a soft silicone tipped device coated with diamond dust). This creates a tear in the ILM, which causes the unstained, exposed retina to stand out in bold relief, against the surrounding green stained ILM. Fine intraocular forceps are used to grasp the flap and perform a continuous circular tear maneuver similar to a capsulorrhexis. This is referred to as a "macularrhexis".

In some cases, ICG staining of the tissues may remain visible for a few days postoperatively. This does not seem to cause any adverse effects. As we gain more experience with the dye, new applications may become evident and allow our vitreoretinal surgery to become even more refined.

Our challenge is to take our talents to their highest level.

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herpes viruses behaves in a similar fashion, and as in CMV, if the retinal infection is controlled with antiviral drugs, good functional vision can be salvaged.

Recurrent retinal detachments with proliferative vitreoretinopathy (PVR) require moderately long-term tamponade. With silicone oil, retinal breaks can be kept closed, with less reliance on patient positioning, although the surface tension of silicone oil is less than that of a gas bubble. Although the Silicone Oil Study Group results showed no difference between silicone oil and perfluoropropane gas in reattaching the retina, many surgeons use silicone oil in PVR cases in order to allow patients to have less restrictions of their activity. However, silicone oil is not a substitute for meticulous dissection of all epiretinal membranes and release of all traction.

In severe PDR, with rubeosis, the silicone oil may prevent diffusion of angiogenesis factors and thereby reduce the incidence of neovascular glaucoma after vitrectomy. Conversely, in some hypotonous eyes, the silicone oil may help maintain a more normal intraocular pressure. This is particularly true in cases with large areas of bare RPE.

Macular hole surgery has become routine, but patient compliance with face down positioning correlates with successful closure of the hole. Silicone oil tamponade is a valuable adjunct in patients who are unable to maintain that position. The closure rate appears to be similar to gas, and patients can resume more normal activity levels much sooner after surgery. They can also travel by air if necessary. The rate of cataract formation is probably similar to that with gas. Unfortunately, silicone oil removal is necessary in all of these patients, and is usually performed six to twelve weeks after the initial surgery.

Specific complications of silicone oil include glaucoma, due to several mechanisms. Overfilling will rotate the lens-iris diaphragm forward, causing angle closure. In aphakic eyes, an inferior iridotomy is necessary to prevent pupillary block. In phakic eyes, cataract is common. (There is also a hyperopic shift due to the high index of refraction in phakic eyes. In aphakes, the silicone globule in the pupil can act as a lens, actually reducing the hyperopia.)

Silicone oil does not prevent re-proliferation of epiretinal membranes. Some patients develop significant recurrent pre-retinal membranes, and recurrent traction or rhegmatogenous detachments. Residual fibrous tissue can develop into large areas of fibrovascular proliferation along the retina-silicone interface, causing either recurrent traction retinal detachment or sub-silicone hemorrhage. Re-operating on these patients can be very challenging. Fortunately, some of these membranes can be removed by peeling or segmentation through the oil, with dramatic results.

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agement method for small and medium sized melanomas. Because of the wavelength, the diode laser is thought to achieve deeper penetration than the argon laser photocoagulation. Although TTT has more side effects than argon laser, the treatment seems to be much more effective in destroying the tumor. Side effects of TTT include branch retinal vein occlusions and vitreous hemorrhage.

Once the diagnosis of choroidal melanoma is established and the lesion has been studied by ultrasonography, fundus photographs, and fluorescein angiography, patients are informed of the various treatment options. After a retrobulbar injection is given, the lesion is treated using the **large** spot aperture with overlapping spots of 300 mw power and 1 minute duration. The spot size is adjusted from 1 to 3 millimeters to spare critical structures. The end point of each 60 second application is to achieve a light gray burn. The intensity is increased or lowered in 50 milliwatt steps to accomplish this desired result. A 0.5 mm margin of normal retina is included in the treatment. Postoperative follow up exams at 1 to 3 month intervals include clinical examination, B-scan ultrasonography, and fundus photographs. Re-treatments are performed until the melanoma regresses into a flattened chorioretinal scar.

We have treated a number of patients at Georgia Retina with TTT, and to date the results seem quite promising, with dramatic shrinkage of the tumors documented by B-scan ultrasonography, and transformation into chorioretinal scars.

P.C. is a 64 year old secretary with diabetes and hypertension who was noted by her eye doctor to have a choroidal nevus in 1987. When the lesion enlarged and became elevated in September 1999, she was referred to Georgia Retina. At the time of her initial retinal examination, her visual acuity was 20/25 in both eyes. No conjunctival sentinel vessels were observed. Her irides had numerous tiny nevi. Her lens exhibited mild to moderate nuclear sclerosis. A 2 by 2 disc diameter elevated gray lesion was observed 4 disc diameters above the left fovea. We recommended careful observation every 3 months for this small melanoma and no intervention. Baseline chest x-rays and liver function tests were performed and were normal. Dermatologic consultation searching for pigmented lesions was unremarkable. One year later, when the lesion showed further activity and enlargement (see B-scan), including the development of a serous retinal detachment that spread into the macula dropping her vision to 20/300, the patient was informed of all treatment options. She elected to proceed with TTT (see pre-op and post-op photos). Six weeks later, her vision improved to 20/40 +2. The tumor was smaller, but still elevated. Therefore, a second treatment was undertaken three months later to induce further regression. Visual acuity remains at the 20/40 level and a follow-up visit is planned in 6 weeks.

From the Administrator's Desk...

Enjoying Your Raise?

A raise for eye docs? That's what the headlines read in bold print – **"2001 Fee Schedule Gives Eye Doc's a 4.5% Raise!"** Good news? Maybe. Maybe not. We've become so accustomed to reductions and cutbacks that many of us might view this as quite an accomplishment. We've learned to lower our expectations when it comes to reimbursement. Hopefully we're also learning to do a better job at cost containment, as that is probably the only way to thrive in today's ever squeezing managed care environment.

Faced with expenses that increase constantly, we will all have a difficult time maintaining an acceptable level of overhead if we are counting on this "raise" to be our panacea. How many of our staff members would be content with a 4.5% raise after years of cutbacks coupled with an increasing workload, especially in today's job market?

The key to all of our survival is in containing costs and increasing efficiency. It's unfortunate that we don't have the time to research and compare quality and cost of every little paper clip and pencil that we need, but we can certainly make a difference in the bottom line by finding the best vendors to handle our smaller items and not being afraid to negotiate the larger ones.

As our fee schedules don't seem to be on the rise, it surprises me that the group health insurance company that we use for Georgia Retina employees think they can justify a 39.7% rate increase in premiums. New federal mandates that require carriers to insure the previously uninsurable, have of course, contributed to the rise in premiums. This feels like a hidden tax increase for the small business owner! Shopping around for an alternate carrier didn't appear to be an option for us this year; but creative negotiating to include larger deductibles and co-payments has helped. A shift in the risk for the increase in the deductible and co-payments to the employees with the most utilization seems to be our best option and prevents us from having to raise everyone's premiums. When all was said and done, our premium increase was "only" 9%, and we have a year before we have to go through this again. This is only one of many opportunities we have to save money and stay afloat.

Of course, it doesn't hurt to reuse those paper clips…, they can be bent back into shape!

Barbara Wright

We participate in the following insurance plans :

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Aetna Select Choice HMO, Elect PPO
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AHI Healthcare Systems
American's Health Plan
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Other plans are pending,
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