

LIVING WITH GLAUCOMA

Volume 28, Number 1

Winter 2013

THE POWER OF LIGHT

LASER TREATMENT FOR THE EYE

Early in my glaucoma an astonishing treatment was recommended. My ophthalmologist told me about a new treatment using a laser. A group of ophthalmologists in Florida were pioneering it. My doctor toyed with sending me there, but months later, he was able to take advantage of training and recommended that he perform the procedure. The next morning at my follow-up appointment, he was delighted. My pressure was down, I had no ill effects and I could go to work. The birth of laser technologies for managing glaucoma and other eye problems was born. On September 21, 2013, the Group welcomed Christopher Teng, MD, Glaucoma Associates, who updated us on the various uses of laser treatment.

Three types of lasers are used to restore the anatomy of the eye—the Argon, the Selective, and the Yag. Depending upon the condition, one or more is used. The procedure for all laser treatment is performed in the doctor's office using the slit lamp. For each condition, depending upon the doctor's preference, the use of the Argon and the Selective lasers is interchangeable, especially with open-angle glaucoma. Below are the conditions that are corrected using laser therapy.

ANGLE-CLOSURE GLAUCOMA. Two types of laser treatment depending upon the condition are performed for restoration of the angle—For laser iridotomy, the Argon and the Yag are used; for Peripheral, Iridoplasty, the Argon.

OPEN-ANGLE GLAUCOMA TREATMENT – Laser trabeculoplasty.

The lasers used to decrease pressure are Selective Laser Trabeculoplasty (SLT) and Argon Laser Trabeculoplasty (ALT).

The Yag laser can be used in roughly two situations-- to perform a laser iridotomy, either in conjunction with an argon laser, or solo to perform a laser iridotomy. It is also used to laser an opening in the capsule or the membrane that is causing opacity following a cataract operation. This is called a YAG Capsulotomy.

Basically, glaucoma treatment at this stage is fluid reduction, a procedure that lowers pressure and acts to preserve the visual field. The ciliary body manufactures the nourishing fluid, important for sustaining the health and rigidity of the eye. Because fluid production is ongoing, it is necessary for the fluid to be able to travel from the ciliary body through the pupil, and then drain through the angle into the Schlemm's Canal where it ultimately becomes part of the circulatory system. Blockage of this route occurs in glaucoma. Blockage occurs with both open-angle and closed- or narrow-angle glaucoma.

CLOSED- or NARROW-ANGLE GLAUCOMA. In this condition, a number of different mechanisms occur that block the angle. It may be swollen by a cataract or the angle may be so narrow that dilation of the pupil can close it. This may occur with people who have perfect vision both near and distant. If the angle is blocked off, the fluid builds up and increases the pressure in the eye. It is possible that a person who has never had an eye problem suddenly experiences halos, headaches, nausea as the drain becomes blocked and the pressure rises alarmingly high, developing into high-pressure glaucoma. Treatment consists of:

LASER IRIDOTOMY: Both the Yag and the Argon may be used, either separately or both, depending upon the situation. Choice of laser may depend upon the doctor's preference or on the condition of the eye. The goal, however, is the same—to create a hole in the colored part of the eye, the iris, to establish a bypass mechanism for the fluid to travel between the back and the front of the eye. The tiny hole in the iris restores the anatomy of the eye, thus restoring the pressure differential between the iris and the front of the eye. The route created allows the fluid to travel from the back to the front instead of going through the area that has become blocked off. This causes

the iris to flatten out, resulting in freeing the drain to accept the fluid. Experiencing the procedure is no big deal. A small amount of Pilocarpine is used to constrict the pupil to better enable the doctor to place the hole in the periphery of the iris. The drop also prevents a pressure rise from the procedure. A lens is placed on the eye to allow for focus on the iris and to protect the structures of the eye. The laser hole is usually made in the upper quadrant or at the 3 and 9 o'clock positions of the eye. In total the procedure takes from 5 -15 minutes.

Following the procedure the patient is put on pressure-lowering drops (one drop), and a steroid. The steroid is used to calm down the inflammation that occurs from the intervention. Inflammation is the eye's response to the treatment and it causes debris in the eye. Imagine those globe paperweights that people had on their desks before paperless. The globe usually held a winter scene and if you shook it up snowflakes danced around within the closed space. With inflammation there is a flurry of debris loosed by the procedure. The macrophages rush in to clean up the eye and the steroid tamps down this whole reaction. Follow up is relatively straightforward. Right after, the patient sits quietly for a half hour, the pressure is checked to ascertain whether there is a pressure spike. The patient returns a week later for another check, and then usually a month later.

COMPLICATIONS: There may be a transient pressure rise. Inflammation may continue to be observed in the eye. The hole may not adequately achieve the purpose and may need to be enlarged. Bleeding may occur because there are blood vessels in the iris.

ARGON LASER PERIPHERAL IRIDOPLASTY. The condition of the eye requiring this procedure is usually related to narrow angle or a phacomorphic condition (caused by excessive size of the lens or when a cataract develops or with a cataract in the aging eye.) The eye doesn't change in length but the cataract changes. Often, it is used following the laser iridotomy that upon evaluation needs additional treatment. Usually the Argon is the laser of choice. Typically 20 to 24 tiny burns are placed along the periphery on one side of the iris, resulting in contracting it and flattening

it out, evicting it from the angle. The normal anatomy of the eye is restored. The pre- and the post-treatment is the same as in the iridotomy.

ULTRASOUND MICROSCOPY: Ultrasound is a technique to better visualize the angle structures of the eye. It validates the success of the operation.

OPEN-ANGLE GLAUCOMA: Instead of lasering the iris to restore anatomy, the procedure involves directly lasering the drainage area of the eye. Argon Laser Trabeculoplasty (ALT) and Selective Laser Trabeculoplasty (SLT) are the procedures used to correct this condition. There is a lot of action and structures packed into your eyeball. Because the structures are so tiny, they require an instrument such as a laser to create an alternate drainage system. When pressure rises in open-angle glaucoma, the theory posits that the drainage channels have become clogged with debris. By creating additional spaces, fluid can again percolate through the meshwork and leave the eye. Both procedures target the trabecular meshwork that is composed of collagen beams.

The Argon: The doctor creates a series of tiny burns between the beams of the trabecular meshworks to create spaces that allow the fluid to flow out of the eye.

The Selective: This is a different type of laser that selectively targets pigmented trabecular cells. The trabecular meshwork contains both pigmented and non-pigmented cells.

The Procedure is similar to the aforementioned laser treatments. Pilocarpine is always used because it opens the angle by constricting the pupil. Powerful medications are used to lower the pressure and numb the eye. A different type of lens is used although the concept is similar. The laser beam is focused directly on the angle of the eye. A relatively lower power is used with the ALT; duration of each pulse is 0.1 second, basically a quick burst of energy. The burns are 50 microns in size—very tiny. Fifty shots are placed over 180 degrees on the trabecular meshwork. Choices are the superior half, the inferior half, the nasal half or the retina half. Usually

one half is done first and then if more lasering is necessary, the other 180 degrees. Altogether 80 to 100 shots may be applied over 360 degrees.

The Argon is a thermal laser, which is why it creates burns. While scientists are not quite sure of the mechanism in which the laser works, they speculate that it tightens the meshwork that then pulls the inner layer open. The beams overlap each other. By creating a burn between a pair of beams, they contract. The laser activity also produces an action in the macrophage cells that rush in to remove the debris. The laser treatment is also thought to stimulate remaining cells.

The Selective Laser, a new type treatment selectively damages the pigmented trabecular meshwork cells. The number of spots made equal those of the ALT. There is not a clear understanding of exactly how it works but it also may be due to macrophage activation that clears pigment and debris from the trabecular meshwork. Compared to the ALT, the SLT creates less tissue injury because it is a cold rather than a hot laser. As a result it can be repeated a number of times, while the ALT is limited to treating the meshwork areas only once. Doctors, therefore, extend the treatment options by treating a section of the 360 degrees at a time. Usually the choice is to create the burns on 180 degrees at a time. Once the 360 degrees have undergone laser treatment, ALT is no longer a viable treatment. But with SLT, treatment is possible multiple times overlapping in the same spots and for this reason it has become the laser treatment of choice among many practitioners.

For the various forms of open-angle glaucoma, laser therapy works best with Primary Open-Angle Glaucoma, Pigmentary Syndrome Glaucoma, and Exfoliation Syndrome Glaucoma. The treatment is excellent in decreasing the pressure in these conditions. Other conditions with varying results include Aphakia Glaucoma (no lens in the eye), Angle-Recession Glaucoma, Steroid Response Glaucoma. Poor results occur in Uveitic Glaucoma and ICE Syndrome, a less common type of glaucoma.

Post Treatment is also the same. To prevent inflammation in the eye when ALT is used, the doctor prescribes a dose of steroids. SLT, however,

requires a different approach. Most doctors are not using steroids because cellular activity needs to be promoted, that is, unless the patient is in discomfort. In that case, steroids are then prescribed to ease the discomfort.

As with all laser treatments the pressure is checked after 30 minutes. The concern is a pressure increase following the procedure, an event known to happen. In many cases it is a transient pressure rise.

EFFICACY: All the studies indicate that lasers are a good first-line treatment. Both ALT and SLT show similar efficacy. If you have a higher initial pressure, there tends to be a greater decrease in pressure. If your pressure is very high, however, laser tends to be not as effective. The effect varies over time. With some patients it lasts a long time; others a shorter period, in which case, an additional treatment is indicated. The effects of laser do decrease over time.

The laser treatment doesn't work immediately. It may take several days or weeks to see the actual results. Examining the patient on the day of the treatment reveals the same pressure. Typically, the patient is seen a week later just to make sure the pressure is performing well. Usually, a month following the treatment a drop in pressure is evident. Success rate is from 65 to 90% at the end of one year for laser trabeculoplasty.

Patients, of course, wish that the laser treatment will allow reduction or elimination of drops. Alas, most patients still need to be on some medications. Because the research has shown evidence that laser can be a first line treatment, patients are free to make a choice whether to start with laser first or medications first. Actually, it really is a patient and doctor decision and may be affected by the doctor's preference. Dr. Teng believes that most patients tend to choose medications first before laser, but one of his patients wants only laser and no medication. He finds that patients are opting out of medication wherever possible or less medication. People seem to want to reduce their use of pharmaceuticals.

The use of laser treatment with the Argon has been around since the '70's and the SLT, a newer development was introduced in the '90's.

We want to thank Dr. Christopher Teng for his lucid explanation of the laser therapy and, of course, his warm delivery and sensitivity to the questions raised by the Group.

=====

RESOURCES for PEOPLE with LOW VISION

GLAUCOMA – PATIENT TO PATIENT, A Coping Guide for You and Your Family
by Edith S. Marks, available on Amazon.com

Andrew Heiskell Braille and Talking Book Library

212-206-5400

40 West 20 Street Worth a visit to see their collection of large-print books and audio books . They also have a computer support clinic.

talkingbooks.nypl.org

Baruch College Computer Center for Visually Impaired People (CCVIP)

646-312-1420

Computer classes for people with low vision

www.baruch.cuny.edu/ccvip/

Eye Assist Inc.

845-201-8113

eyeassist@optonline.net

Maxi_Aids

800-522-6294 Request catalog—low vision tools

www.maxiaids.com

Office of Children and Family Services

Commission for the Blind and Visually Handicapped

212-825-5710

Ocfs.ny.gov/main/cbvh

Vis-Ability Inc.

800-598-0635 Ask for catalog

access@Bestweb.net

vis-abilityinc.com

Request catalog --Sells low-vision gadgets and specialized computers

Visions Services for the Blind and Visually Impaired

212-625-1616

www.visionsvcb.org

Novel **LIKE EVERYBODY ELSE** by Edith S. Marks, available on Amazon.com—
story about a blind man with sight restored in one eye and the difficulties that
ensue as a result

=====

Please note: The contents of this newsletter are for informational purposes only.
The Content is not intended to be a substitute for professional medical advice,
diagnosis or treatment. Always seek the advice of your physician or other qualified
health provider with any questions you may have regarding a medical condition.

=====

Editor: Edith Marks

Associate Editor: Janice Ewenstein

Production/Mailing: Ann Bially, Linda Flood, Susan Genis, Marianne Howard,
Elaine Paris, Grace Pellicano, and other glaucoma patient volunteers.

This newsletter is published by The Glaucoma Support and Education Group, The New York City Chapter of The Glaucoma Foundation.