Laser Surgery in Ophthalmology

The term "LASER" stands for **L**ight **A**mplified **S**timulated **E**mission of **R**adiations. Lasers are forms of light that can hold a huge amount of energy. The light can focus the energy on a target. That energy can be in the form of heat or can be used for cutting.

There are four types of lasers used in eye surgery:

- **Argon Laser** - produces heat or burns.
- **Diode Laser** - produces heat or burns.
- **YAG Laser** - used for cutting thin membranes or holes in tissues.
- **Eximer Laser** - used for cutting.

The eye surgeon will use the proper laser, depending on the disease.

MOST COMMON USE OF SPECIFIC LASERS:

Argon Laser: Used most often to treat diseases of the retina (*layer of nerves at the back of the eye that collect light*). Also, used in some forms of glaucoma (open angle glaucoma).
Diode Laser: Used most commonly for diseases of the retina.
Yag Laser: Used to cut through tissue (such as membranes remaining after cataract surgery). Or to make an opening in the iris, to prevent or treat certain types of glaucoma (narrow angle glaucoma).
Eximer Laser: Used in LASIK to help reshape the cornea and eliminate the need for glasses.

Here are some examples of how lasers are used in specific eye diseases:

Diabetes

Diabetes can affect the retina. The retina contains the nerve endings needed for sight. Since diabetes is a disease that affects small blood vessels, it can cause the blood vessels of the retina to bleed or fail to deliver enough oxygen to the retina (*diabetic retinopathy*). The treatment for some forms of diabetic retinopathy is to create burns in certain areas of the retina. The burns will destroy the tissue and stimulate new, normal blood vessels to grow. Argon and Diode lasers are used to create these burns.

Retinal Holes or Tears

When a hole or tear occurs in the retina, there is a high risk of the retina coming away from its attached position. This causes a retinal detachment, which can result in blindness. Argon and Diode lasers are used to seal the area around the hole or tear. This makes it much less likely that the hole or tear will allow fluid to get under the retina and progress to retinal detachment.

"After-Cataracts"

When cataracts are removed, using modern surgical techniques, a thin capsule that normally forms the back of the natural clear lens is left in place, to support an artificial lens (*lens implant*). Although these capsules usually remain clear, they can sometimes become cloudy weeks or months after successful cataract surgery. The cloudy capsule can interfere with light entering the eye, just as the cataract did. This situation can be corrected by making a cut in the capsule that was left in the eye, using a YAG laser. This procedure is painless, takes only a few minutes to perform, and results is almost immediate improvement of vision. While lasers cannot be used to remove cataracts, they can be used to treat this type of "after-cataract."

Refractive Errors (Nearsightedness, Farsightedness, Astigmatism)

When glasses are needed to see better, it is often because of the shape of the clear front surface of the eye (*cornea*) or because the eyes are too long or too short. This non-medical condition is called a refractive error. The Eximer laser has precise cutting capabilities that allow the eye surgeon to reshape the cornea. This laser can also reduce or eliminate many kinds of refractive errors in procedures known as LASIK surgery.

Other examples of eye conditions, which can be treated by laser surgery, are:

- Eyelid growths, including lid cancers.
- Misdirected eye lashes (*trichiasis*).
- Opening up or treating blockage of the opening to the tear ducts (*lacrimal punctum*).
- Benign (*non-cancerous*) growth on the tissue that covers the surface of the white part of the eye, and may grow onto the cornea (*pterygium*).
- Increased eye pressure (*glaucoma*).
- Prevention and treatment of attacks of acute glaucoma (*laser iridotomy*).
- Retinal tears and detachment treatment.
- Diabetic retinopathy.
- Treatment of cancer of the eye (such as retinoblastoma).
- Open angle glaucoma.

BEFORE THE PROCEDURE

Almost all types of laser surgery for eye diseases are done on an outpatient basis (*you go home the same day*) and cause little discomfort. It may be necessary to use drops one to two hours before the procedure, to enlarge (*dilate*) the pupil. This is for laser operations that will treat the retina or any tissue inside the eye. It allows the caregiver to see inside the eye more easily. For laser operations that involve the eyelids or the front of the eyeball, medicines or drops are rarely required. However, surface numbing medicines or drops may be used on occasion.

LET YOUR CAREGIVER KNOW ABOUT:

- All medicines you are taking. This includes natural herbs and over-the-counter medicine.
- If you are very farsighted or have a history of having an attack of acute glaucoma.

RISKS & COMPLICATIONS OF THE PROCEDURE

- Some drugs or natural herbs can make the skin very sensitive to light, such as St. John's Wort.
- The risks and complications of each procedure are different, depending on the condition being treated and the nature of the laser treatment.

THE PROCEDURE

- Depending on the type of laser used, the procedure often involves the patient looking straight ahead while the surgeon focuses the laser beam on the targeted eye tissue.
- In some cases, a clicking noise is heard as the laser beam is applied.
- Depending on the tissue being treated and the type of laser used, the patient may see a bright flash of light. You may also feel a slight sensation with each application of the laser beam.
- Some lasers used to treat skin problems on the lids are applied using hand-held devices.
- After putting in numbing drops, for certain laser procedures, the caregiver may need to place a special lens on the eye, in order to do the laser operation. This is painless and will be removed after the procedure.

AFTER THE PROCEDURE

- Sometimes a mild medicine is given, to control discomfort.
- Your activity level after the procedure depends on the nature of the disease being treated.
- In most cases, the patient may engage in normal activity right away.
- For certain diseases of the retina, to prevent or treat retinal detachment may require restricted activities. This is until the caregiver finds that the desired amount of scarring has occurred, to prevent a further problem.

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