

LASERS AND GLAUCOMA

Lasers are devices of modern technology capable of producing high-energy light beams that can be used for some types of surgery. Each type of laser is named for the substance used to create its light energy. Those used for treating eye problems derive their power from argon, helium and neon, krypton, carbon dioxide, ruby, yttrium-aluminum-garnet (YAG), or other sources. Each one creates a different color light beam, which affects different eye tissues in different ways. Thus no one laser can be used for every purpose.

Lasers and Eye Surgery

Lasers offer significant advantages in many types of eye surgery. Since the light can be focused precisely on extremely tiny structures, it can make much finer surgical cuts than are possible with a scalpel. Often, no incision on the eye is necessary, so laser surgery minimizes the risk of infection and the problems related to wound healing. Most laser surgery is painless.

What does a surgical laser do?

To cut or burn tissue, laser energy needs to be absorbed by tissue. How much energy is absorbed depends on its pigmentation. Argon, ruby, and krypton laser beams, for example, are absorbed mainly by dark tissue. These beams pass harmlessly through clear structures to reach the back of the eye for retinal surgery or the fluid drainage channels near the front of the eye for glaucoma surgery. However, the YAG laser beam, which is also used for some types of glaucoma surgery, can cut both clear and pigmented tissues.

Glaucoma

Glaucoma is a term used to describe a group a group of eye disease in which the pressure within the eyeball is increased. High pressure can damage the optic nerve and cause loss of vision. Two types are often treatable with lasers: open-angle glaucoma (the common type) and closed-angle glaucoma.

The "angle" is an area where fluid drains from the eye to keep pressure normal. In open-angle glaucoma, the buildup of pressure is gradual, over years, due to a microscopic blockage in the filter-like drainage tissue (trabeculum) near the angle. In closed-angle (also called acute) glaucoma, high pressure can appear very quickly (hours or days) due to a narrowing and sudden blockage of the angle.

When and how are lasers used for glaucoma?

Eye drops and/or oral medications are usually all that is needed to lower fluid pressure in the eye. If these measures cannot keep the pressure at safe levels and if there is evidence or danger of visual loss, laser surgery may be recommended.

In open-angle glaucoma, a laser trabeculoplasty (LTP) can enlarge the pores in the filter (trabeculum) so that more fluid may flow through it and thus lower the pressure within the eye. In closed-angle glaucoma, a laser is used to cut small hole(s) in the iris (colored part of the eye), to allow fluid from behind the iris to reach the angle more easily. This operation is called laser iridotomy.

How is laser surgery performed?

Laser surgery may be done either in the doctor's office or the outpatient eye department of a hospital or clinic. It does not require hospitalization or general anesthesia. You will be comfortably seated in front of the laser instrument. It is helpful for you to stay calm and not move during the treatment, so an assistant may steady your head. Sometimes a local anesthetic is injected behind the eye to keep it from moving during treatment.

The doctor directs the laser beam by looking through a slit lamp (clinical microscope) at the area being treated. Each time the laser is "fired," you will see a flash of colored light and hear a quick tapping sound. A special type of contact lens called a gonioscope will be held against the eye so the beam can be focused more accurately. Following the treatment, your eye pressure may be checked, since the pressure sometimes increases temporarily after surgery. You may need to use eye drops at home until the pressure returns to normal.

Risks and Prognosis

Surgery of any type involves some risk, and a laser is "strong medicine" that can do harm as well as good. Each laser shot creates a tiny burn that, if successful, can create appropriate drainage, but it can also cause some bleeding or even too much scarring from the burns. The results are not entirely controllable or predictable.

Laser surgery also may not be the only treatment required. Even when it is totally successful in stabilizing the glaucoma, you may still need to continue using medications to control the pressure. There is also the possibility that there will be only a temporary or partial benefit, or even an actual worsening of pressure control. You will have to weigh the chance of obtaining a successful result against the risks. If laser surgery does not resolve the problem, traditional surgery may be necessary later.