

Treatment Effects of LASER

LASER (Light Amplification by Stimulated Emission of Radiation) is a concentrated small beam of light, created when electric current passes through a special material. LASER derived from different materials will serve different applications in Eye diseases as follows:

1. Seal blood vessels to stop bleeding or fluid leaking.
2. Bond the retina to the back of the eye (e.g. seal off retinal holes before the retina is actually detached).
3. Treat Glaucoma: create an opening in the iris for treatment of narrow angle glaucoma; open the eye's filtration system for glaucoma treatment; destroy part of the ocular structure responsible for aqueous production.
4. Destroy abnormal tissue such as some form of intraocular tumours.
5. Cut or sculpt like a knife, to change the shape of the tissue applied on e.g. corneal surface.

Laser Surgery in Eye Diseases

1. Retinal Diseases

- a. **Retinal tears or holes:** The retina is the inner layer of the eye that senses light and helps you see. If the retina tears, it can detach from the back wall of the eye and lead to vision loss. Laser helps to seal off the tear and bond the retina to the wall of the eye to reduce the chance of detachment.
- b. **Diabetic retinopathy:** Eye diseases due to diabetes is a major cause of vision loss. Diabetes can cause ischemia and the growth of abnormal blood vessels in the retina. These vessels are brittle and may leak (macular edema) or bleed inside the eye leading to swelling in the macula and bleeding in the vitreous. Laser is used to seal the leaking blood vessels, reducing macular edema to prevent further vision loss. However, laser itself cannot improve vision. It slows or stops abnormal blood vessels growth to reduce the chance of bleeding inside the eye. It has been shown that in patients with severe diabetic retinopathy, laser treatment can decrease the risk of severe visual loss in 50% - 60% of patients. However, not every patient responds to laser the same way. Some respond poorly. Others require more than one laser sessions to achieve the regression of the growth of abnormal blood vessels.
- c. **Macular degeneration:** The macula is the small, central area of the retina that allows us to see fine details clearly. Macular degeneration affects the central or reading vision. "Wet" macular degeneration is the bleeding and scarring of the macula due to abnormal blood vessels. Laser may seal the blood vessels and prevent further damage. A particular type of macular degeneration (age-related macular degeneration) may need special medication injected into the vein to assist the effects of laser.
- d. **Other retina problems:** Retinal vein occlusions, central serous retinopathy, types of tumors of the eye.

Common Risks and complications of Laser Surgery in Retinal Diseases

Decrease vision (dimming visual field defects)	Retinal fibrous tissue overgrowth
Decreased accommodation and refractive error	Retinal detachment / break
Bleeding in the retina or vitreous	Cornea or Lens injury
Macula and optic nerve injury	Blindness

2. Glaucoma

- Glaucoma damages the optic nerve, usually caused by high intraocular pressure. Vision loss may be prevented or slowed down if treated before severe damages occur in the optic nerve.
- Laser may be used to lower the pressure by laser iridotomy, laser iridoplasty, laser trabeculoplasty and ciliary body destruction. Possible risks and complications of Laser Surgery in Glaucoma:

Failure to penetrate iris	Temporary eye pressure elevation	Iris Bleeding or infection
Closure of laser iridotomy	Glare double or multiple images	Blindness
Transient blurring	Corneal or lens injury	

3. After Cataract Surgery

After a cataract is removed, the posterior capsule of the lens may become cloudy. YAG laser can open up the cloudy membrane and restore clear vision. Possible risks and complications of Laser Surgery in Cataract:

Failure to open up the cloudy membrane	Macula edema
Residual / recurrence of posterior capsule opacification	Glare and seeing multiple images
Rarely intraocular lens subluxation / dislocation	Transient rise of eye pressure
Retinal detachment	Vitreous floater

4. Oculoplastic Surgery

Laser can be used to treat certain eyelid diseases and lacrimal drainage problems.

5. Cornea new vessels

The normal cornea is transparent and avascular. Ocular insult, like infection, inflammation, can lead to the growth of new blood vessels (from the limbus), which may threaten vision through corneal haemorrhage, scarring, and lipid deposition. Laser can be used to occlude the abnormal corneal new vessels. Possible risks and complications of Laser surgery in corneal new vessels.

Iris damage	Corneal limbal stem cell damage	Reactivation of preexisting eye disease
Inflammation	Corneal haemorrhage	Corneal thinning or perforation

Things to take note on discharge after Laser Surgery

1. Take adequate rest and avoid eye contusion. Avoid contact sports and high platform diving (especially patients with retinal tears).
2. Laser treatment is not 100% effective and safe. Regular follow up on treatment results and possible complications. Some may need more than one session of laser treatment.
3. Laser surgery helps to control the disease and prevent further loss of sight, but hardly restore or improve vision.
4. If you have acute severe eye pain, vomiting or significant blurring after laser therapy, please consult your doctor immediately or go to nearby Accident and Emergency Department for treatment.

Remarks

This is general information only and the list of complications is not exhaustive. Other unforeseen complications may occasionally occur. In special patient groups, the actual risk may be different. For further information please contact your doctor. Evangel Hospital reserves the right to amend this leaflet without prior notice. We welcome suggestions or enquiries on the information provided in this leaflet. Please contact our Healthcare professionals so that we could follow up and make improvement.

Reference:

Hospital Authority: "Laser Surgery of the Eye" (2023)

Smart Patient: http://www.ekg.org.hk/pilic/public/Ophthal_PILIC/Ophthal_EyeLaserSurgery_0068_eng.pdf (06-07-2023)