Patient information leaflet

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LASER TREATMENT FOR DIABETIC RETINOPATHY

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WHAT IS LASER?

Laser is the acronym for Light Amplification by Stimulated Emission of Radiation. The laser machine generates a powerful light beam consisting of a single wavelength of light.

WHAT IS DIABETIC RETINOPATHY?

Over time, high blood glucose will cause damage to retinal blood vessels, leading to diabetic retinopathy. The damaged blood vessels might leak onto the macula at the centre of the retina (often referred to as diabetic maculopathy or diabetic macular oedema/swelling) or, because of the damage to the blood vessels, they eventually close off completely, leading to ischaemia (death) of the peripheral retina.

This ischaemic retina then produces a substance called vascular endothelial growth factor (VEGF), which stimulates the growth of abnormal new vessels on the surface of the retina (referred to as proliferative diabetic retinopathy). These vessels often bleed or are accompanied by scar tissue, which contracts over time and pulls the retina off (tractional retinal detachment).

HOW DOES LASER WORK IN DIABETIC RETINOPATHY?

When a laser is aimed at the eye, there are three types of tissue reactions that can be seen depending on the wavelength of the laser light used: photocoagulation (burns), photodisruption (small explosion), or photoablation (precise removal of tissue).

Many people are familiar with the excimer laser, which utilises light of 193 nm and causes ablation of the surface of the cornea, thereby changing the refraction of the eye and allowing patients to see without spectacles. This is however not the same laser used for the treatment of diabetic retinopathy. In the case of diabetic retinopathy we need to use a laser with a wavelength of 532 nm to photocoagulate (burn) the retina. Retinal phototcoagulation is usually of three types:

Panretinal (scatter) laser photocoagulation

A large number of laser burns (up to 3 000) are made to the peripheral retina to destroy the ischaemic areas of retina thereby decreasing the production of vascular endothelial growth factors and ultimately leading to regression of the abnormal new vessels on the surface of the retina.

Focal laser photocoagulation

The laser beam is directed at specific leaking blood vessels (micro-aneurysms) in a small area at the centre of the retina (macula) to seal off the leak. The burns are usually few, small and of low power.

Grid laser photocoagulation

The laser treatment is done for diffuse leakage in the macular region. The beam is not aimed at specific blood vessels, but rather is put down in a grid pattern around the central point (fovea) at the back of the eye, always remaining about 1 mm away from the fovea.

WHY SHOULD I HAVE LASER TREATMENT?

Laser treatment is done to reduce the risk of vision loss caused by diabetic retinopathy. It is most often used to stabilise vision and prevent future loss rather than improve vision loss that has already occurred.

Focal laser for focal maculopathy may sometimes restore some lost vision.

WHAT TO EXPECT DURING TREATMENT

Your treatment will be performed in a specially equipped laser room. Your pupils will be dilated in order for your doctor to see your retina well. Topical local anaesthetic drops will be instilled into your eye. In the majority of patients this is enough anaesthesia, but a small percentage of patients, who have a lower pain threshold, may need a regional local anaesthetic injection for scatter laser treatment. The laser can be performed in one of two ways:

- Most commonly you will be seated at a slit lamp and a contact lens will be placed on the cornea (front of the eye). This keeps the eye open and stabilises the eye and also helps to focus the laser beam on the retina.
- Sometimes your doctor might prefer to have you lie down on a bed and use an indirect ophthalmoscope (attached to the doctor's head) to deliver the laser beam. This method is useful when the doctor's view of the retina is slightly obscured by cataract or blood, but is a more difficult technique to master. It can only be used for scatter laser and not for focal or grid laser.

Focal or grid laser is usually done in one sitting, but scatter laser might be accomplished over a few sessions.

WHAT TO EXPECT AFTER TREATMENT

The vision will be blurred immediately after the treatment, but should recover to the pre-treatment level over time. You should plan to have someone drive you home and you should relax for the rest of the day. Remember to bring a pair of dark glasses, as your pupils will remain dilated for a few hours making your eyes very sensitive to light. Most patients resume normal activities within a day or two. Regular follow-up visits are required.

HOW WELL DOES IT WORK?

Laser is unlikely to restore vision already lost, but when performed in a timely manner:

- focal laser, targeting specific blood vessels, is effective in reducing the risk of vision loss in people with macular oedema
- scatter laser, treating the peripheral ischaemic retina, reduces the risk for severe vision loss by 50 to 60% over six years in people with high risk of vision loss. Studies suggest that up to 90% of cases of legal blindness caused by proliferative retinopathy could be prevented by prompt scatter laser.

WHAT ARE THE RISKS?

Laser burns and destroys part of the retina and can result in some permanent vision loss, which is unavoidable. Panretinal/scatter treatment may cause mild loss of central vision (due to increased macular oedema), reduced night vision, reduced peripheral vision and decreased ability to focus. This is mild compared to the vision loss that may be caused by untreated retinopathy.

Rare complications of laser treatment, which may cause severe loss of vision, include:

- bleeding in the eye/vitreous haemorrhage (as part of scar formation)
- tractional retinal detachment (as part of scar formation)
- accidental laser burn of the fovea (centre of the macula).

WHAT IF I DECIDE NOT TO HAVE THE TREATMENT?

Untreated retinopathy invariably leads to severe loss of vision.