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National Horizon Scanning Unit
Horizon scanning prioritising summary

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Yag laser for blocked retinal venouscirculation: To prevent or restore visual loss in patients suffering non-ischemic central retinal vein occlusion.

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Adelaide Health Technology Assessment

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PRIORITISING SUMMARY

REGISTER ID: **0000060**

NAME OF TECHNOLOGY: **YAG LASER FOR BLOCKED RETINAL VENOUS CIRCULATION**

PURPOSE AND TARGET GROUP: **TO PREVENT OR RESTORE VISUAL LOSS IN PATIENTS SUFFERING NON-ISCHEMIC CENTRAL RETINAL VEIN OCCLUSION**

STAGE OF DEVELOPMENT (IN AUSTRALIA):

☐	Experimental	☐	Established
☒	Investigational	☐	Established *but* changed indication or modification of technique
☐	Nearly established	☐	Should be taken out of use

AUSTRALIAN THERAPEUTIC GOODS ADMINISTRATION APPROVAL

☒	Yes	ARTG number	10216, 76019
☐	No	☐	Not applicable

There are several ophthalmic Yag lasers registered on the TGA, distributed by Designs for Vision Pty Ltd and Ellex Medical Pty Ltd t/a Laserex.

INTERNATIONAL UTILISATION:

COUNTRY	LEVEL OF USE		
	Trials Underway or Completed	Limited Use	Widely Diffused
Australia (RCT underway)	✓		
Canada	✓		
USA	✓		

IMPACT SUMMARY:

The Lions Eye Institute, Western Australia, have developed a technique to bypass blocked retinal venous circulation utilising a Yag cutting laser in order to prevent or restore vision loss.

Retinal vein occlusion may occur in the central or branch veins. Central retinal vein occlusion (CRVO) is associated with common systemic vascular disorders such as hypertension, arteriosclerosis and diabetes and may result in severe visual loss, predominantly in elderly patients (Williamson 1997). Vascular occlusions may occur in retinal arteries or veins, however, the venous form is by far the most common (Lions Eye Institute 2002).

CRVO occurs when the retinal vein becomes occluded and drainage of blood from the retina slows, causing blood to pool in the retina (macular oedema), resulting in distorted vision. Swelling of the optic nerve and retinal haemorrhaging may occur. The retinal veins appear distended and tortuous (Lions Eye Institute 2002). Neovascularisation of the retina with

secondary glaucoma can occur weeks to months after the occlusion (Williamson 1997). Symptoms vary from mild blurring to complete blindness inside the eye and pain from high intraocular pressure. Initial vision loss is painless (Merk Manual, 17th edition 1999).

There is currently no effective treatment for ischemic or non-ischemic CRVO (Leonard et al 2003, Browning et al 1997).

Laser-induced anastomosis for nonischemic central retinal vein occlusion involves the use of a high intensity Yag laser to create an anastomotic connection between the obstructed retinal vein and the choroidal vein. The high intensity laser is required to break through the Bruch's membrane which overlays the choroidal circulation. Patients with visual acuity reduced to 20/100 are candidates for laser treatment. The laser application is made under topical anaesthesia.

In the case series (level IV evidence) by McAllister et al (1998) a total of 91 eyes from 91 patients underwent Yag laser treatment for CRVO (average duration 15±15.2 weeks). Successful anastomoses were created in 49/91 (54%) of eyes. Of these successful eyes, 8/49 (16%) went on to develop progressive narrowing of the proximal segment vein between the disc and the anastomotic site within an average of 5 months post-laser treatment. Immediate complications included subretinal haemorrhage at eight sites and vitreous haemorrhage in three eyes, which spontaneously cleared. Late complications included closure of the distal vein in 26/91 (29%) of eyes, neovascularisation in 20% of eyes and avascular fibrous tissue proliferation in 9% of eyes. In the 49/91 (54%) of eyes in which a successful anastomosis was created a visual improvement of between 2 and 20 (mean 4.4±3.8) lines was noted in 84%, 12% had no improvement in visual acuity and 4% had a worsened visual acuity. In the 42/91 (46%) of eyes that were unsuccessful 40.5% experienced an improvement in visual acuity, 19% remained the same and the remaining 40.5% experienced a deterioration of visual acuity.

Fekrat et al (1998) and Eckstein and McAllister (2000) reported similar results of 33% and 43% of patients with a successful anastomosis, respectively.

Retinal vascular occlusive disease is the second most common vascular cause of blindness after diabetic retinopathy and the fifth most common cause of loss of vision in Australia (Lions Eye Institute 2002). Prevalence of central retinal vein occlusion is difficult to estimate, however, the study by Cooper (1990) estimated that 2.5% of blind certificates issued in Western Australia between 1984 and 1988 were as a result of retinal vein occlusion (both central and branch). Newland et al (1996) estimated the prevalence of monocular and binocular blindness in the South Australian population aged over 50 years as approximately 3.7 and 1.3%, respectively. These figures, however, do not give a true indication of the prevalence of CRVO, as CRVO does not always result in blindness.

This procedure doesn't have a Medicare Benefits Schedule item number but would be similar to photocoagulation of the retina, item number 42809, which has a fee of $375.

CONCLUSION:

There is only the level IV evidence available describing this experimental procedure, which may have the potential to cause serious side effects in unsuccessful patients. In addition, it is unlikely to diffuse further than the original centre in Western Australia.

HEALTHPACT ACTION:

It is therefore recommended that this technology be archived.

SOURCES OF FURTHER INFORMATION:

Browning, D. J. & Antoszyk, A. N. (1998). 'Laser chorioretinal venous anastomosis for nonischemic central retinal vein occlusion', *Ophthalmology,* 105 (4), 670-677; discussion 677-679.

Cooper, R. L. (1990). 'Blind registrations in Western Australia: a five-year study', *Aust N Z J Ophthalmol,* 18 (4), 421-426.

Eckstein, M. & McAllister, I. (2000). 'Laser-induced chorioretinal venous anastomosis for non-ischaemic hemi-central vein occlusion', *Clin Experiment Ophthalmol,* 28 (1), 18-21.

Fekrat, S., Goldberg, M. F. & Finkelstein, D. (1998). 'Laser-induced chorioretinal venous anastomosis for nonischemic central or branch retinal vein occlusion', *Arch Ophthalmol,* 116 (1), 43-52.

Leonard, B. C., Coupland, S. G. et al (2003). 'Long-term follow-up of a modified technique for laser-induced chorioretinal venous anastomosis in nonischemic central retinal vein occlusion', *Ophthalmology,* 110 (5), 948-954; discussion 955.

Lions Eye Institute Annual Report, 2002.

McAllister, I. L. & Constable, I. J. (1995). 'Laser-induced chorioretinal venous anastomosis for treatment of nonischemic central retinal vein occlusion', *Arch Ophthalmol,* 113 (4), 456-462.

McAllister, I. L., Douglas, J. P. et al (1998). 'Laser-induced chorioretinal venous anastomosis for nonischemic central retinal vein occlusion: evaluation of the complications and their risk factors', *Am J Ophthalmol,* 126 (2), 219-229.

Williamson, T. H. (1997). 'Central retinal vein occlusion: what's the story?', *Br J Ophthalmol,* 81 (8), 698-704.

SEARCH CRITERIA TO BE USED:

Anastomosis, Surgical
Choroid/*blood supply
Laser Coagulation/*methods
Retinal Vein/*surgery/pathology
Retinal Vein Occlusion/*surgery/diagnosis
Visual Acuity
Anastomosis, Surgical/methods
Choroid/*blood supply/pathology/surgery
Ischemia/etiology/pathology/surgery
Laser Coagulation/*methods
Laser Surgery/*adverse effects
Retinal Neovascularization/etiology/pathology/surgery
Fluorescein Angiography