Proliferative Retinopathy

What is proliferative retinopathy

In this condition very small blood vessels grow from the surface of the retina.

The retina is the film at the back of your eye , and the tiny blood vessels are capillaries. These growing blood vessels are very delicate and bleed easily. Without laser treatment, the bleeding causes scar tissue that starts to shrink and pull the retina off, and the eye becomes blind.Laser treatment prevents blindness, but often some vision is lost.

Enlarge side view: in proliferative retinopathy 'new blood vessels' grow on the surface of the retina and can bleed.

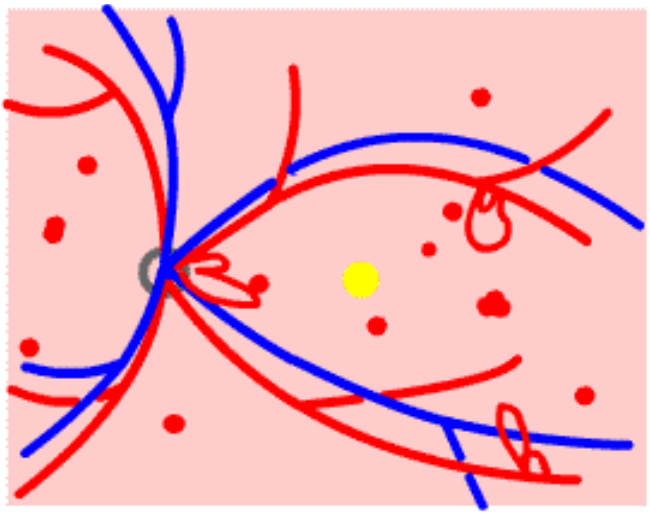
Visited 06/24/2010

If you have had diabetes for years your retinae may develop this condition. As the retina is damaged by diabetes, the diseased retina releases special growth chemicals. These chemicals make tiny blood vessels grow: these are called 'new blood vessels'.

See Animation, case with obvious new vessels, photo , photo

Some details

The new vessel growth in diabetes only occurs in the retina, nowhere else in the body. When a retina becomes damaged by a higher than normal sugar, over many years, it seems to release special growth hormones.



Enlarge New blood vessels growing on the retinal surface and slightly in front of the surface.

VEGF is one of the main growth hormones; VEGF stands for Vascular Endothelial Cell Growth Factor. It seems to be manufactured and released by 'sick' retinal capillaries, and in turn makes other capillaries grow. This seems to be an exaggeration of one of the body's normal responses.... the retina becomes starved of nutrients, and then the retina makes chemicals that make new blood vessels grow to deliver more nutrients.

There are other growth factors and processes involved.

Drugs are being tried out that block VEGF and stop it working, and are starting to be used. Ophthalmologists are not yet sure how to use these new drugs.

Description of events in proliferative retinopathy

the mechanism of proliferative retinopathy (start at top) with laser treatment	**diabetes for years** **^** **retinal damage** **^** **retina releases growth chemicals** **^** **'new vessels' grow** **^** **laser burns** **^** **oxygen and nutrient flow to retina improves** **^** **new vessels close up** **^** **more diabetes damage to retina** **^** **more new vessels grow** **^** **more laser needed** **^** **new vessels close up** **^** **and so on until eventually they stop growing**

Laser Treatment

We believe laser works as the tiny laser burns allow more oxygen and nutrients to reach the retina, and this improves the retinal circulation. The retina then stops making the growth substances, and the 'new vessels' close up as a result.

Deterioration may be rapid if the control of your diabetes suddenly improves: see rapid progression.

Enlarge **Laser burns for proliferative retinopathy. 500-1000 burns in a typical session**

Laser is the main way of treating this condition. With laser the new vessels will usually stop growing, although sometimes several laser sessions are needed.

The new vessels do usually close up, but may start growing again 4-8 months later, and requiring more laser.

1000 or so laser shots are applied at each visit (see Laser Treatment), but in the average

insulin-dependant person 3000 or more shots may be needed at the onset (3 sessions), with more laser of 3000 burns a little later, and more now and again.

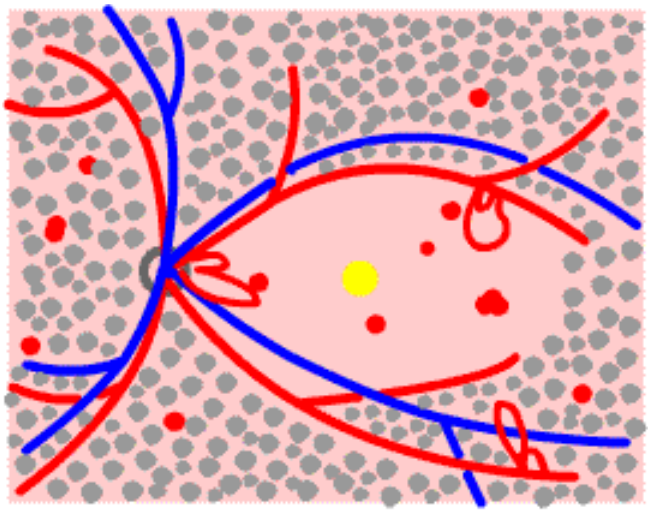
See photos.

After laser, regular examination is needed. This patient has persistent retinopathy, but an angiogram showed there were no new vessels. (HbA1c 9%) (Case 39).

Severe proliferative retinopathy

If you have the severest type of proliferative retinopathy, a lot of laser is needed over the years. As a result, your side vision and night vision may be badly affected.
Often the best result that can be achieved in 2007 is maintaining good (perhaps not perfect) central vision, enabling you to work, watch TV, and read.

If the blood vessels continue to grow despite laser they may bleed, causing haemorrhages such as this subhyaloid haemorrhage.



Enlarge Extensive laser is needed for some people with proliferative retinopathy

More bleeding causes vitreous haemorrhages. These is make it difficult seeing..like looking through cobwebs.

A fluorescein angiogram will detect the areas of non-perfusion, but these can be estimated clinically. An angiogram is therefore seldom required prior to laser for proliferative retinopathy see. In any respect, the laser treatment does not have to be precisely applied in any particular section of retina.

See also and here if maculopathy is present *as well as* proliferation...new drugs are being used.

Early vitrectomy in severe proliferative retinopathy

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There are many reports that early vitrectomy can help patients with severe or very active proliferative retinopathy (cases presented EASDec 2010 and many previous years). Most growth factors are released from the retina, and are reduced by laser and anti-vegf treatment, but the growth factors are released into the vitreous. The vitreous acts like a back of growth factorts, and so if the retina is lasered but the new vessels remain, then this is probably because of vitreal growth factors, and if the vitreous is removed the neovascularisation will regress. The same may apply to macular oedema...if this remains depite lots of laser (in patients who have had extensive laser for proliferative retinopathy), early vitrectomy may be helpful. There are many case reports supporting this, but not large studies.

Nevertheless, very few experts recommend early vitrectomy, but perhaps we should. This is probably because of the uncertain outcome of vitrectomy (see).

Diabetes is not forgiving

Good control of your diabetes is important if you want to keep your sight. Unfortunately retinopathy can still affect people who have tried really hard to control their diabetes. Doctors treating people with retinopathy know that their patients have tried really hard, but the condition can be really vicious. There are some genetic factors that make it more likely for some people to get proliferative changes than those that don't, but as we cannot get new genes we have to make the most of what we have.

We now believe that if you can reach these targets below, and do not smoke, the conditions has every chance of stabilising and you will need much less laser than you would have otherwise.

Conversely we know that if someone's diabetes diabetes is very badly controlled, the eye disease can be very severe indeed.

Targets

Controlling the diabetes is critically important in the long term. see

Without laser

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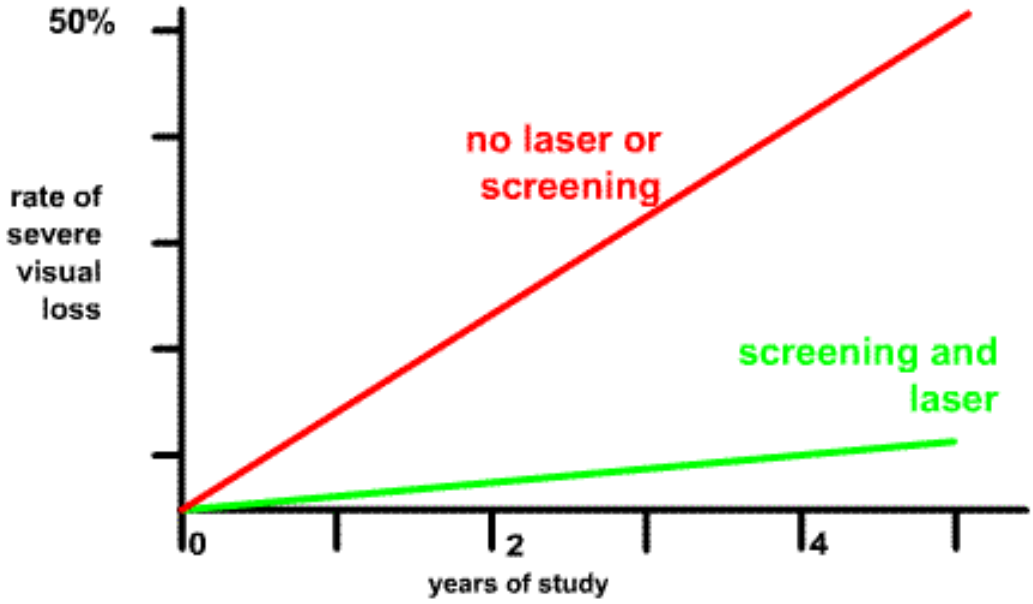
Without laser 10% of patients lose vision each year (see & ETDRS).

Laser may not keep all sight, but unless's your diabetes has been very badly controlled or the laser was started very late, it will keep most of your sight (see). The benefits of laser last all your life.



Photos

before laser

enlarge

before laser

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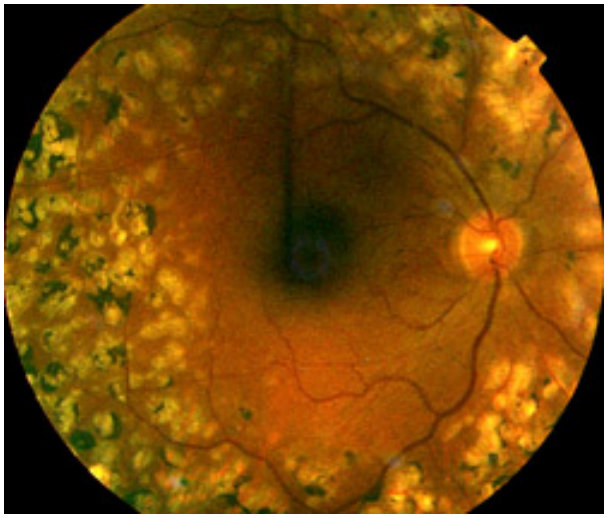
after laser

enlarge

after laser

enlarge

see this case; also, see case 3 to zoom in a similar case



the laser burns

enlarge

the laser burns

enlarge

This patient presented late, and his new vessels remain despite laser, indirect laser, and IVT. Vision on presentation was 6/60 & 6/9, and has deteriorated to 6/60 & 6/36 despite treatment. He is awaiting his first dose of Avastin. enlarge

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Avastin

Avastin may be helpful pubmed 2008 . We have found it useful if given with laser.

Even without laser, new vessels disappear in a few days, but unless there is adequate laser they always seem to reappear. Even with laser, they may reapear. Nevertheless, Avastin should prove extremely helpful. Few Primary Care Trusts will fund treatment in the UK. We had a few patients funded and could see the effects, but now funding has been withdrawn.

In this paper complete laser was given, but the new vessels continued to grow. The Avastin was then given after the laser was completed. Given in this way the Avastin was effective if given every 3 months.
Avastin is not considered safe alone...laser must be given also, but nearly all retinopathy experts would like to have access to Avastin for certain stages of proliferative retinopathy, particulary reducing the new vessel growth whilst waiting for the laser and good diabetic control to take effect (see 2010).

When stable can be discharged

After 3 years of no laser or new vessel growth, and if there are no/very few retinal haemorrhages, patients can be discharged from the clinic. Photographic monitoring is best restarted, in a screening program. Such patients also need to be checked for glaucoma (at their optometrists, yearly checks), and many will develop cataracts.