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Patient Information: Diabetic Eye Disease

How can diabetes affect my eyes?

People with diabetes have raised levels of sugar in their blood. This can cause health problems in several ways and your eyes are one part of your body that can be affected. Your eyes can be affected in a number of ways:

- Cataracts – a clouding of the lens of the eye
- Diabetic retinopathy
- Diabetic maculopathy

This information leaflet focuses on diabetic maculopathy and diabetic retinopathy. A separate information leaflet on cataracts is available on request.

General advice for people with diabetes

It is important to ensure that your diabetes is well controlled, as well as your general health, including your weight, cholesterol and blood pressure. High blood sugars and high blood pressure can lead to worsening diabetic maculopathy and retinopathy. Therefore, you should work closely with your endocrinologist and/or GP to manage your blood sugars and blood pressure. If you smoke, stop, as the combination of diabetes and smoking poses significant risk. GPs are very good at providing support to stop smoking. Have your cholesterol checked, and treated if necessary.

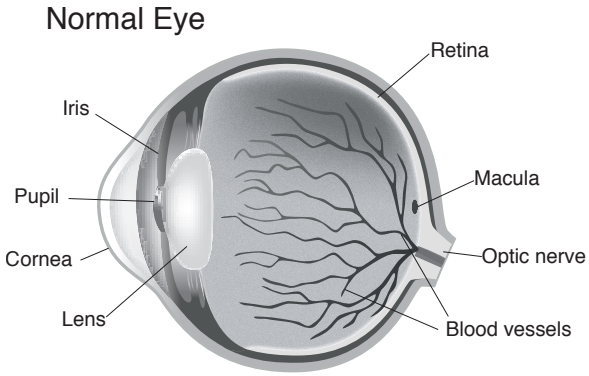
UK patients with diabetes are required to inform the DVLA that they have diabetes, to determine their eligibility to drive. Most people with diabetes are safe to drive, but not all. Those living outside the UK should contact their drivers' licensing agency for advice.

If you are planning to get pregnant you should be monitored more closely, so please let Professor Jackson know if you are pregnant, or are planning to get pregnant in the near future.

The retina, macula and fovea

The **retina** is the lining inside the back of the eye. It functions a bit like the film in the back of a camera, absorbing light and forming an image of the outside world. The most important part of the retina is the **macula** - this is the part of the retina that the light is focused on. The macula gives the central vision that is important for fine visual tasks such as reading and driving. In the centre of the macula is the **fovea**, the most visually sensitive part of the macula.

What follows is advice about diabetic maculopathy and diabetic retinopathy**.** These may occur separately, or together, in the same eye.



DIABETIC MACULOPATHY

What is diabetic maculopathy?

In diabetic maculopathy, the raised sugar levels damage the fine blood vessels that supply the macula. The vessels can become leaky, causing fluid to accumulate in the macula. This is called **diabetic macular oedema**. Alternatively, the vessels can become blocked which restricts blood supply to the macula. This is called **ischaemic maculopathy**. Diabetic macular oedema and ischaemia may sometimes coexist.

What are the symptoms of diabetic maculopathy?

If diabetic macular oedema or ischaemia involve the fovea, then this usually causes blurred vision.

What is the treatment for diabetic maculopathy?

Unfortunately, there is no treatment for macular ischaemia. Macular oedema is treated with **macular laser** and the injection of drugs into the eye, either **anti-VEGF drugs** or **steroids**. These drugs may be used alone or can be used in combination with laser. Each option is detailed below.

Macular laser

When would macular laser be used?

Macular laser may be required if the fluid (oedema) involves, or threatens to involve, the fovea. Macular laser aims to dry up the fluid.

What happens during macular laser?

Macular laser can be done during an outpatient visit and takes about 5-15 minutes. You will be asked to sign a consent form indication that you understand the risks and benefits of treatment. These are summarised below. It is important that you fully understand these before proceeding with treatment, so if you have any questions or concerns, please do ask Professor Jackson for more information.

The forehead above the eye to be treated will often be marked, indicating the side to be treated. Drops are put into your eyes to dilate your pupil and numb your eye. You sit in a chair with your chin and forehead resting on a chin and headrest. A contact lens is placed on the surface of your eye to keep it open and focus the laser beam onto the macula.

You will see a bright flash of light as the laser is fired, multiple times. You should keep your gaze steady in one position, usually looking straight ahead. If you need a break or feel dizzy, let Professor Jackson know, as it is fine to take a break. Otherwise, keep still and keep your head resting against the headrest (patients often tend to drift back during treatment).

What are the benefits of macular laser?

The aim of macular laser is to reduce or resolve macular fluid. If the fluid already involves your fovea then successful treatment will usually improve your vision (although not necessarily back to normal, as other factors such as macular ischaemia may coexist). If the fluid threatens, but does not yet involve your fovea, then macular laser will not improve your vision, rather, it aims to reduce the risk of you losing vision from neighbouring fluid that might otherwise spread to involve your fovea.

What are the risks of macular laser?

Macular laser is generally a very safe procedure, but all eye treatments carry some degree of risk. However, Professor Jackson will not suggest macular laser as a treatment option unless he feels the benefits outweigh the risks.

Your vision will be temporarily blurred due to the bright lights of the laser and the dilating eye drops. The effect of the bright lights wears off within a few minutes, but the dilating drops take several hours to wear off, so do not drive to the

consultation. The dilating drops also cause increased sensitivity to light, until they wear off, hence sunglasses can sometime help, but are optional.

Your eye may well be a bit sore, red and gritty due to the contact lens, but this should settle over the day. Less commonly, the contact lens can cause an abrasion on the surface of the eye, and this may take a day or two to heal. If your eyes feel gritty or sore that is normal, and you can buy some over-the-counter artificial tears and use them as required, alongside your usual painkillers such as paracetamol, but if your eye is painful please contact our office.

Macular laser may lead to small blind spots to the side of your central vision. Very rarely, if the laser accidentally hits the foveal centre, then you can have a serious and permanent loss of central vision, but this is very rare (less than a 1 in 100 risk).

Macular laser may need to be repeated if the macular oedema persists, or recurs, but it usually only requires one or two sessions.

Anti-VEGF eye injections

What are anti-VEGF intravitreal injections?

These drugs are injected into the vitreous cavity, the inner cavity of the eye. They are designed to reduce the level of vascular endothelial growth factor (VEGF) inside the eye. VEGF is a chemical that causes macular blood vessels to leak, leading to diabetic macular oedema.

Common anti-VEGF drugs are:

- Eylea (afilbercept)
- Lucentis (ranibizumab)
- Avastin (bevacimumab) – this is not licensed for use in the eye, but it is commonly used worldwide and has a relatively similar effect to the other two licensed drugs, but costs less. The reason Avastin is unlicensed is not that it is unsafe, but because the drug company that owns Avastin also owns the more expensive Lucentis, so it has no commercial incentive to license Avastin.

Anti-VEGF drugs control the disease but do not eliminate it. Therefore the injections need to be repeated, typically 4-8 times a year.

What do anti-VEGF intravitreal injections involve?

Your injection will be usually given at an outpatient visit. A nurse will get you ready for your treatment. You will lie on a couch in a treatment room. You will be given eye drops to numb the front of your eye and an iodine eyewash will be used to clean your eye and the skin around it (if you are allergic to iodine please let Professor Jackson know). Your face will be covered by a special drape and your eyelids will be held gently open with a small clip during the procedure, so that it does not matter if you blink.

Professor Jackson will give the injection into the white of your eye. Most people say that the injection is painless, or stings for just a moment, but it is usually less stressful and painful than people first imagine.

Your vision may be blurry after your injection so you should not drive until your vision returns to normal. This is mainly due to the dilating eye drops that are given to examine the eye prior to injection.

What are the benefits of anti-VEGF intravitreal injections?

Large, high quality clinical trials indicate the anti-VEGF injections are very effective at treating macular oedema. Consequently, most patients get an improvement in vision after starting treatment (or a reduced chance of losing vision in those whose macular oedema has not yet reached the fovea, but might without an anti-VEGF injection).

If there is also macular ischaemia then this may limit the benefit from anti-VEGF injections, but they may still be worthwhile.

What are the risks of anti-VEGF intravitreal injections?

In general, anti-VEGF injections are very safe and well tolerated.

Following your injection you will often get a bloodshot eye or see moving spots (floaters) in your vision. These are normal side effects and should improve in a few days. If they do not, or if they get worse, please contact our office or the clinic.

Some people might feel a little bit of pain or discomfort after their injection. If needed, you can take everyday painkillers such as paracetamol, but if the pain does not go away or gets worse you should contact our office straight away.

Other common side effects are an increase in eye pressure and detachment of the vitreous (gel-like substance inside the eye). The high pressure tends to settle, and the vitreous detachment is seldom damaging. You can get an abrasion on the surface of the eye. This is often quite painful, but usually resolves over a day or two.
Injections can occasionally damage the natural lens of your eye, or lead to detachment of the retina; both can damage the vision and require surgery, but thankfully they are rare.

The most serious problem is infection inside the eye (endophthalmitis). This requires urgent treatment with an antibiotic injection into the eye, but despite treatment endophthalmitis can often damage the vision, sometimes severely so. It could even lead to loss of the eye. However, endophthalmitis is extremely rare, occurring in only about 1 in 2,000 to 1 in 6,000 injections.

It is possible that anti-VEGF injections may be associated with an increased risk of stroke or heart attack, although the risk is very small, and indeed some studies

question if it exists at all. However, if you have previously had a stroke or heart attack please inform Professor Jackson.

Steroid eye injections

What are steroid eye injections?

Steroid injections reduce the leakiness of blood vessels in the macula, and thereby reduce the macular oedema. The most commonly used steroids are Triamcinolone, Ozurdex, and Iluvien. The last two come as a very small implant that is injected into the eye. The implants slowly release the drug over time. Triamcinolone comes as very fine crystals that also release the drug slowly, albeit not as slowly.

What are the benefits of steroid injections?

The key advantage of steroids is that they last longer than anti-VEGF injections, with Triamcinolone lasting several weeks or a few months, Ozurdex a few to several months, and Iluvien up to about three years. Because they last a long time, far fewer injections may be needed compared to anti-VEGF injections.

What are the risks of steroid injections?

The main downside is that they cause cataract (a clouding of the natural lens of the eye), but not in those who have already had cataract surgery. Therefore, they are usually reserved for those who have already had cataract surgery. The second important downside is that they are more likely to cause high eye pressure. This may need treatment with eye drops, or rarely surgery, to avoid or treat glaucoma (a condition characterised by loss of peripheral vision). They are not associated with a risk of heart attack or stroke. Triamcinolone may be associated with inflammation in the eye. Except for these differences, the risks are similar to anti-VEGF injections, including loss of vision from endophthalmitis. Whereas Ozurdex and Iluvien are licensed for use in the eye, Triamcinolone is not. It is therefore used ‘off-label’. In general, licensed medications are preferred, but for a small minority of patients Triamcinolone may be an option, mainly because it does not last as long (hence any problem with raised eye pressure may also not last so long).

What symptoms should I look out for after an eye injection?

You should be on the lookout for any symptoms that might suggest a problem, after an injection. Surface irritation of the eye, redness, small floaters and blurred vision are expected, but if your vision is getting worse rather than better, eye pain is increasing, if you notice lots of flashing lights in your vision or a shadow or veil coming over your vision, then you should contact our office immediately.

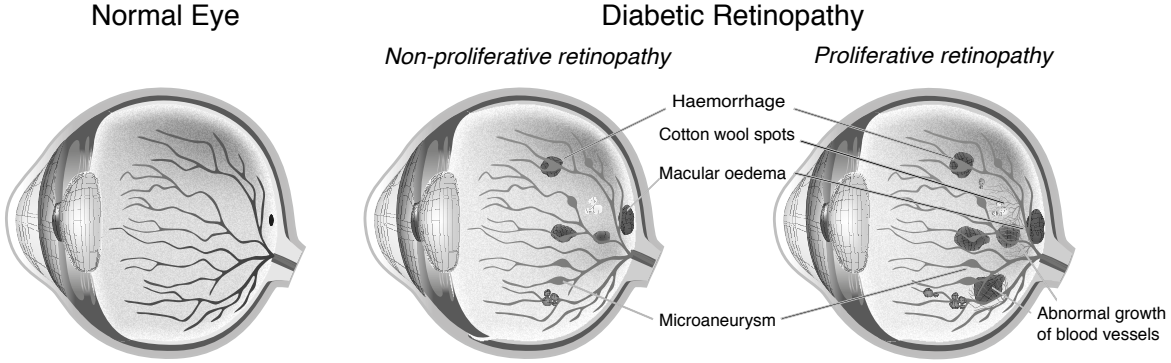
DIABETIC RETINOPATHY

What is diabetic retinopathy?

Diabetes can affect the fine blood vessels that supply the retina. The longer you have diabetes, and the worse your diabetic sugar control, the more likely you are to have diabetic retinopathy.

Diabetic retinopathy can be mild, moderate or severe. Most patients have mild to moderate disease. In the most severe type, fragile new vessels grow in the retina, termed proliferative diabetic retinopathy. These proliferating new vessels are weak and sometimes bleed. This can lead to severe loss of vision from bleeding into the cavity of the eye (vitreous haemorrhage), or scarring that pulls the retina off the back of the eye (tractional retinal detachment).

In the illustration below, the left-hand image shows a normal retina. In less severe 'non-proliferative diabetic retinopathy' there may be small retinal haemorrhages (microhaemorrhages), focal dilation of blood vessels (microaneurysms) and fluffy white 'cotton wool spots' due to focal compromise of the retinal blood supply. These features of retinopathy may or may not co-exist with macular oedema. In more severe 'proliferative diabetic retinopathy' there are also fine new blood vessels that grow from the retina.



How is diabetic retinopathy monitored?

Diabetic retinopathy can progress in the absence of any symptoms. Therefore it is important to have your retina examined regularly, as you may not be aware of a problem.

If you have diabetes, but no diabetic retinopathy, you should book to see Professor Jackson yearly. Mild retinopathy is usually examined about six-montly, with more frequent review for more severe disease.

Screening is also available in the NHS, usually via a photographic screening service (DECS).

How is diabetic retinopathy treated?

Mild diabetic retinopathy does not need treatment. If you have proliferative diabetic retinopathy you may require PRP laser. Vitreous haemorrhage and tractional retinal detachment often require surgery. Details are provided below.

Anti-VEGF eye injections are occasionally used to treat or prevent proliferative diabetic retinopathy. These are described above in the diabetic macular oedema section.

Panretinal photocoagulation (PRP)

What is pan retinal photocoagulation (PRP) laser?

If you have new blood vessels growing (proliferative diabetic retinopathy), a large area of peripheral retina may need to be treated with laser, to stop new vessels forming. This is known as pan-retinal photocoagulation or PRP laser.

What are the benefits of PRP laser?

PRP aims to make the new vessels get smaller and start to disappear. This reduces the risk of severe loss of vision in the future from vitreous haemorrhage and tractional retinal detachment. Importantly, PRP *does not aim to improve your vision*, instead it aims to reduce the risk of vision loss in the future.

What are the risks of PRP laser?

PRP will often make your peripheral vision worse. This can be frustrating, as intuitively people expect laser to help their vision, yet it can instead make it worse. Loss of peripheral vision is however worth it, if it protects the more important central

vision. You should be aware that loss of peripheral vision may affect your eligibility to drive. Your colour vision and night vision may also be affected.

Very rarely (less than a 1 in 100 chance), PRP laser can severely damage central vision if the laser accidentally hits the fovea, at the centre of the macula.

What happens during PRP laser?

The experience is similar to macular laser, as detailed above. However, PRP laser takes longer (10-30 minutes) and can be more uncomfortable, as a larger number of laser spots are needed, and you may feel some discomfort during treatment. Accordingly, treatment is often staggered over 2-3 treatment sessions.

It may be necessary to 'top-up' PRP laser, in people who have already had PRP laser. Top-up treatment tends to be much less extensive, and is therefore much quicker.

During the treatment you will be asked to move your eyes in certain directions. If you need a short break during the laser treatment please let Professor Jackson know.

Surgery

When might I need surgery for diabetic retinopathy?

A small number of patients with diabetic retinopathy require retinal surgery. This might be for the following reasons:

Vitreous haemorrhage

If vitreous haemorrhage obscures the vision and fails to clear on its own, Professor Jackson may recommend vitrectomy. Vitrectomy removes the vitreous gel that fills the cavity of the eye. This removes the blood. Also, by removing the vitreous, future vitreous haemorrhages are more likely to clear on their own, as the blood is not trapped in the vitreous gel. Vitrectomy is often combined with PRP laser, which can be done during the operation. Professor Jackson will discuss the risks and benefits of vitrectomy, if this is an option. Vitrectomy can sometimes be combined with cataract surgery, if you have not had previous cataract surgery.

Tractional retinal detachment

Surgery (vitrectomy and delamination) aims to remove the scar tissue that pulls the retina off the back of the eye, and thereby allows the retina to reattach. Vitrectomy for tractional retinal detachment may be combined with PRP laser, and sometimes also cataract surgery (if not done previously). This is a complex operation and Professor Jackson will go through the risks and benefits with you, if delamination proves necessary.

Coping with loss of vision

Changes to your vision can be upsetting and worrying. The RNIB Helpline is available for support and advice:

RNIB Helpline: 0303 123 9999
helpline@rnib.org.uk

Any further questions?

Professor Jackson welcomes any questions you might have. Please do not hesitate to ask for more information, or for clarification of anything you do not understand. You can contact our office on 020 7060 1968.

The Royal College of Ophthalmologists provides an information booklet on diabetic eye disease, available at: www.rcophth.ac.uk/patients/information-booklets