

The Impact of Diabetes on Eye Health



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Ms Heng's PhD on preventative therapy in Age Related Macular Degeneration at the Institute of Ophthalmology, University College London formed pivotal laboratory studies and the first clinical study for the 2RT nanosecond laser technology as a possible preventative therapy in AMD.

Ms Heng is a co-editor on the Inspire Program (medical retina) by the Royal College of Ophthalmologists and sits an editorial board member of the Eye Journal.

Ms Heng practices privately in The London Clinic Eye Center and Moorfields Private.

In this article, we will discuss with Ms Heng the implications of a common disease, diabetes and its impact on eyes.

How Does Diabetes Affect the Eye?

The global prevalence of diabetes is 9.3% in 2019 (estimated 463 million) and this is expected to rise to 10.9% by 2045. The prevalence of diabetes is found to be higher in high income and urban nations as compared to rural and lower income countries. Diabetes can affect the eyes in many ways, including cataracts and diabetic retinopathy and diabetic macular oedema.

So what exactly is diabetic retinopathy and diabetic macular oedema?

The retina itself is the light-sensitive layer of cells located at the back of the eye. This layer converts light into electrical signals which are then sent to the brain and turns them to the images we see. The retina is supported by a network of small blood vessels to supply it with its nutrition and remove waste materials. The high sugar levels in diabetes can damage these tiny blood vessels over a period of time.

The phases of damage range from mild background retinopathy (small bleed in the eye and will not cause visual problems) to pre proliferative (more wide spread bleed in the eye, usually picked up during eye screening or examination and will not cause visual problems). Proliferative retinopathy is a term which refers to the growth of new vessels can lead to vitreous haemorrhage or bleeding or possible retina detachment and this may cause visual impairment.

Diabetic Macular Oedema (DMO) itself is accumulation of fluid in the macula, which is the center of the eye where the highest concentration of nerve cells sits. This fluid may compromise vision if it affects the fovea or may cause distortion.

What are some of the Implications of Comorbidities Control on Diabetic Eye Disease?

When your doctor uses the term co-morbidities, they usually refer to the other medical conditions that coexist with diabetes. Examples are high blood pressure or hypertension and hypercholesterolemia. There are risk factors which makes a patient more susceptible to diabetic retinopathy and these include:

1. Patients with type I or II diabetes
2. The risks increases if one has had diabetes for a long time
3. Poorly controlled sugar levels
4. Have hypertension or high blood pressure
5. Have high cholesterol
6. Pregnant
7. Are of Asian or Afro-Caribbean background
8. have had diabetes for a long time

Systemic control of diabetes, hypertension, and hypercholesterolemia in earlier studies in 1980s-1990s have been shown to have positive effects on reduction of progression of diabetic retinopathy and vision loss. It is key to optimise the control of your blood sugar, blood pressure and cholesterol levels.

Symptoms to look for in diabetic eye disease

Symptoms can vary but often include:

- Blurred or fluctuating vision.
- Dark areas or vision loss.
- Poor color vision.
- Spots or dark strings (floaters).

Recognizing these symptoms early can lead to timely diabetic eye disease treatment and better outcomes.

What are some Treatment Options for Diabetic Eye Disease?

Depending on the presenting findings, ie, diabetic retinopathy or diabetic macular oedema, the treatment is geared towards preventing sight loss and improving vision.

In patients with sight threatening or involving diabetic macular oedema, we can treat and reduce the oedema with the following treatment:

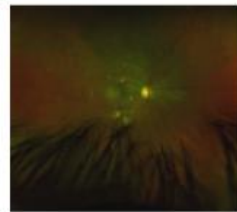
Anti-VEGF Injections: These injections reduce the growth of abnormal blood vessels and leakage. They are commonly used for diabetic macular oedema and proliferative diabetic retinopathy

Corticosteroids: Steroid injections or implants can help reduce inflammation and swelling in the eye. They are another option for treating diabetic macular oedema.

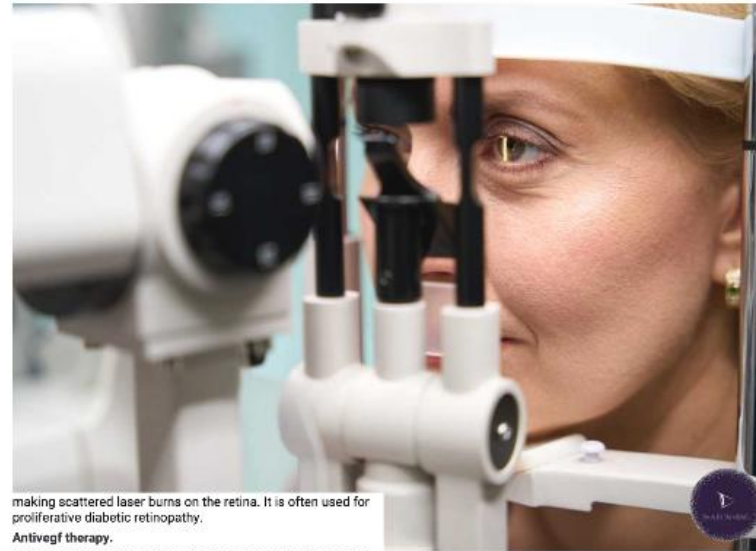
Macular laser: Diffuse or focal macular laser targets specific leaky blood vessels to reduce macular oedema. Since the advent of anti-VEGF therapy, this is now reserved mainly for patients presenting with off center or non-foveal involving macular oedema.

In patients with proliferative diabetic retinopathy or new vessels, to shrink or regress the new vessels and prevent further ischemia, the following treatment may be considered

Scatter Laser Treatment (Panretinal Photocoagulation): This treatment shrinks abnormal blood vessels by



Retina photo: moderate non proliferative diabetic retinopathy with blot and flame shaped haemorrhages and cotton wool spots



making scattered laser burns on the retina. It is often used for proliferative diabetic retinopathy.

Antivegf therapy.

Vitrectomy: This surgery removes blood from the vitreous and scar tissue from the retina. It is typically performed when there is a significant hemorrhage or retinal detachment.

Cataracts and Cataract surgery in diabetic patients

High sugar levels can lead to formation of advanced glycation end products (AGEs) which accumulate in the lens and cause cataracts to develop. Diabetic patients tend to develop cataracts earlier than the normal population.

Cataract surgery and the inflammatory response following surgery may worsen diabetic retinopathy/ diabetic macular oedema. Studies have shown that the addition of non steroidal anti-inflammatory eye drops may reduce the risk of this happening.

In diabetic patients with cataracts and other complications such as diabetic macular oedema, we can consider cataract surgery with anti-VEGF/ steroid implant or steroid injection in the same setting depending on severity of the disease. In diabetic patients with proliferative diseases, cataract surgery can also be performed with indirect laser or anti-VEGF injection in the same setting.

For optimal screening for diabetic retinopathy, it is key to have cataracts assessed and removed for better photographic view and assessment of the retina.

What are some of the Best Practices for Managing Diabetic Eye Disease?

Regular Eye Examinations

Annual comprehensive eye exams are crucial for early detection and management of diabetic eye disease. These exams should include:

- **Dilated Eye Exam:** Allows the eye doctor to examine the retina and optic nerve for signs of damage.
- **Optical Coherence Tomography (OCT):** Provides detailed images of the retina to detect swelling or fluid.

Blood Sugar Control

Maintaining optimal blood sugar levels is critical in preventing and managing diabetic eye disease. Strategies include:

- **Healthy Diet:** Focus on a balanced diet rich in vegetables, whole grains, and lean proteins.
- **Regular Exercise:** Helps control blood sugar and improve overall health.
- **Medications:** Adhering to prescribed diabetes medications and insulin regimens.

Blood Pressure and Cholesterol Management

High blood pressure and cholesterol can exacerbate diabetic eye disease. Controlling these factors involves:

- **Medications:** Taking prescribed medications to manage blood pressure and cholesterol.
- **Lifestyle Changes:** Adopting a heart-healthy diet and regular physical activity.

Smoking Cessation

Smoking increases the risk of diabetic eye disease. Quitting smoking can significantly improve eye health and overall well-being. Resources to aid in smoking cessation include counselling, support groups, and nicotine replacement therapies.

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