

# Diabetic Eye Care

Diabetes Mellitus is a common and potentially serious disease, responsible for damage to many organs in the body, including the

- 1) Eyes causing loss of vision
- 2) Brain, resulting in strokes or dementia
- 3) Heart causing heart attack or heart failure
- 4) Kidneys leading to the need for dialysis
- 5) Feet leading to poor circulation, gangrene and amputation.

This discussion is focused on diabetic eye care; however, it must be noted that the points made about prevention of visual loss through the reduction of medical risk factors and lifestyle changes will also reduce the risk of developing the other complications of diabetes.

**Risk of Visual Loss in People with Diabetes Mellitus** Diabetics have a greater risk of blindness from

- 1) diabetic retinopathy,
- 2) cataract and
- 3) glaucoma.

The best way to prevent loss of vision for diabetics is to

- 1) control the blood sugar through diet, medication and exercise
- 2) control blood pressure
- 3) control blood cholesterol/lipids
- 4) maintain a healthy weight
- 5) stop smoking
- 6) reduce or eliminate alcohol intake and
- 7) have regular eye check-ups to screen for diabetic eye disease, even if vision is normal.



## Diabetic Retinopathy

This is the main cause of visual loss in diabetic patients whose blood sugar levels have not been well controlled. Diabetic patients with well controlled blood sugar levels right from the beginning of the disease, seldom lose vision from diabetic retinopathy.

Diabetic retinopathy may be present even if the vision is normal, thus people with diabetes should have regular eye check-ups either with the eye doctor or with retinal photographs which are reviewed by a health care professional. An eye doctor should be consulted right away if there are abnormal visual symptoms such as

- 1) blurring of vision even with corrective glasses
- 2) wavy vision
- 3) sudden onset of floaters and/or flashes of light
- 4) a dark patch in the field of vision

Diabetic retinopathy is due to damage to the blood vessels in the retina as a result of high blood glucose levels. The retina is the layer of nerve tissue lining the inside of the back of the eye, and is responsible for sensing light and



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passing the light signals on to the brain thus allowing us to see.

**Diabetic retinopathy, when it occurs, goes through a series of stages:**

- 1) Mild, moderate, severe nonproliferative diabetic retinopathy. At these stages, there is increasing
  - leaking from the blood vessels, leading to swelling and exudation,
  - blockage of vessels, causing small bleeds in the retina,
- 2) Proliferative diabetic retinopathy where the neovascularisation (the growth of abnormal blood vessels in response closure of the normal blood vessels) occurs. This results in
  - bleeding into the vitreous chamber at the back of the eye which may manifest as floaters or even sudden loss of vision,
  - tractional retinal detachment causes visual disturbances and, ultimately, blindness.

**Diabetic Macular Oedema**

The centre part of the retina is called the macula, and it is what we use for sharp central vision, such as reading, sewing, playing ball games. At any stage of diabetic retinopathy, swelling of the macula called diabetic macular oedema may occur. This causes blurring of vision of varying degree, depending on the severity of the oedema. The visual loss develops gradually and worsens over time if left untreated.

**Treatment of Diabetic Retinopathy**

Treatment of diabetic retinopathy depends on the stage and the type of retinopathy present.

- 1) Mild to moderate nonproliferative diabetic retinopathy does not require treatment, but

their presence is a wake-up call to keep the blood sugar under strict control, in order to prevent the retinopathy from progressing.

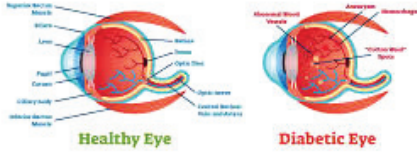
- 2) Severe nonproliferative diabetic retinopathy is sometimes treated with laser photocoagulation to the retina. This is done as an outpatient procedure in the clinic. The purpose of the laser treatment at this stage is to prevent neovascularisation from occurring. A newer form of treatment in the form of injections of an anti-vascular endothelial growth factor (antiVEGF) medication (such as ranibizumab) may be used to improve the stage of diabetic retinopathy.
- 3) Proliferative diabetic retinopathy is mainly treated with laser photocoagulation to stop and prevent further growth of new vessels, thus preventing the blinding effects of bleeding into the vitreous cavity (vitreous haemorrhage) and tractional retinal detachment. AntiVEGF medication may also be used to regress the neovascularisation, shrinking the abnormal vessels away, but is usually used in conjunction with laser photocoagulation, as the effect of the anti-VEGF medication wears off, whereas the effect of laser photocoagulation is more permanent.
- 4) In advanced proliferative diabetic retinopathy, where there has already bleeding and/or tractional retinal detachment, vitreous surgery (vitrectomy) may be required to save vision. In the advanced stages of tractional retinal detachment, surgery may be able to save some sight but may not restore it fully.

**Treatment of Diabetic Macular Oedema**

Diabetic macular oedema (swelling of the macula due to diabetes) can be controlled with injections of antiVEGF medications such as bevacizumab, ranibizumab, aflibercept, brolucizumab or faricimab. These medications reduce the abnormal leakage from the unhealthy diabetic blood vessels, thereby reducing the swelling, resulting in improvement of the vision. In eyes where the diabetic macular oedema has been severe and present for a longer time, the medication may still help to reduce the diabetic macular oedema, but structural changes in the retina may prevent the



## Diabetic Retinopathy



vision from recovering fully.

These medications are injected directly into the eye, because the dosage if given directly into the body, has to be much higher in order to treat the eye. At that dosage, there would be more side effects. The injections are typically given more frequently for the first few months, then fewer treatments may be needed or the treatment may no longer be required if the diabetic macular oedema is resolved. Although the idea of having injections into the eye sounds frightening, it is no more painful or frightening than a regular injection.

### Surgery: Vitrectomy

Surgery may be required to remove blood from the vitreous cavity or to clear scar tissue from the retina in order to prevent or to relieve a traction retinal detachment. This operation is called vitrectomy, as it begins with removing the vitreous gel from the vitreous cavity, which also removes the blood, and then allows the surgeon to peel the scar tissue off the retina. If the damage to the eye is not too advanced, vitrectomy surgery may be able to restore good vision. However, if the damage is too advanced, vision may not be restored.

### Diabetic Retinopathy Screening

It is important for diabetics to have their eyes screened even when vision has not been affected yet, because normal vision may be present even when advanced proliferative diabetic retinopathy develops. In general,

- 1) Type 1 (Insulin dependent) diabetic patients should begin screening 5 years from the time of diagnosis
- 2) Type 2 (Non-Insulin dependent) diabetic patients should begin screening right from the time of diagnosis. This is because Type 2 diabetic patients often have not symptoms, and may have had diabetes for many years before they were actually diagnosed.

### Cataracts

Diabetic patients often develop cataracts earlier than non diabetic patients. Cataract extraction with implantation of an artificial lens to replace the cataractous lens is a common operation which usually improves vision significantly. Cataract surgery inevitably causes some inflammation in the eye, and this can cause diabetic macular oedema to develop or worsen in the early postoperative period. Thus, diabetic retinopathy and diabetic macular oedema should ideally be fully treated and under good control before cataract surgery is performed. The retina should be examined after surgery to assess if there is any progression of diabetic retinopathy.

### Glaucoma

Diabetic patients have a higher risk of developing glaucoma, a disease that results in damage to the optic nerve, due to raised pressure in the eye. During screening for diabetic retinopathy, the intraocular pressure is usually checked as well, in order to pick up glaucoma early, before there is permanent visual loss.

### Summary of Diabetic Eye Care

- 1) Diabetic patients have a higher risk of losing vision, most often from diabetic retinopathy.
- 2) If diabetic retinopathy is picked up early, treatment can maintain vision in almost all cases
- 3) If diabetic retinopathy is picked up very late, vision may be lost even with intensive treatment.
- 4) Diabetic retinopathy screening and attending the follow-up visits with the eye doctor are important ways to maintain vision.
- 5) Management of conditions that affect the blood vessels such as control of the blood sugar, blood pressure and blood cholesterol/lipids will reduce the risk of developing or worsening diabetic retinopathy.
- 6) Lifestyle changes such as maintaining a healthy weight, smoking cessation, nil or moderate alcohol intake, all help reduce the risk of diabetic patients losing vision.