Diabetic Retinopathy
A closer look at diabetic retinopathy, affecting more than 100 million people globally

Diabetic retinopathy is a disease that affects individuals suffering from diabetes, and causes changes to the blood vessels found within the retina, resulting in decreased vision and blindness. The retina is light-sensitive layer at the back of the eye that senses light and transmits images to the brain.

According to Vision 2020, diabetic retinopathy is a significant cause of blindness. Globally, of diabetic patients who have had the disease for more than 15 years, 2% become blind and approximately 10% develop severe visual impairment.

Four Stages of Diabetic Retinopathy
Often occurring without noticeable symptoms, diabetic retinopathy damages the blood vessels of the retina in four stages:

• **Stage 1: Mild Non-proliferative retinopathy** - At this earliest stage, micro-aneurysms occur, which are small areas of balloon-like swelling within the retina’s tiny blood vessels.

• **Stage 2: Moderate Non-proliferative retinopathy** - As the disease progresses, some of the blood vessels that nourish the retina become blocked.

• **Stage 3: Severe Non-proliferative retinopathy** - In severe cases, many more blood vessels are blocked, depriving several areas of the retina of blood supply. These areas of the eye then send signals to the body to grow new blood vessels in order to provide critical nourishment for the retina.

• **Stage 4: Proliferative retinopathy** - At this advanced stage, a lack of oxygen causes fragile blood vessels to grow along the retina and within the vitreous gel that fills the inside of the eye. Without timely treatment, these new blood vessels can bleed, cloud vision and destroy the retina.

At any stage, fluid can leak into the center of the macula, the part of the retina responsible for sharp, straight-ahead vision. This fluid causes the macula to swell and blur vision, a condition called macular edema. About half of people with proliferative retinopathy also develop macular edema.

Global Impact
Diabetic retinopathy has widespread impact across the globe, and is more prevalent in developed countries.
Causes and Risk Factors
All people with diabetes - both type 1 and type 2 - are at risk of diabetic retinopathy. The longer someone has diabetes, the more likely they are to develop diabetic retinopathy. Patients who have better control of their blood sugar can slow the onset and progression of the disease.

Prolonged, high blood sugar levels in diabetics can cause damage or swelling to the small blood vessels in the retina. This blood vessel damage can lead to vision loss:
- Abnormal blood vessels can leak fluid into the macula, the area of the retina responsible for clear central vision. The macula is small, but it allows us to see colors and fine detail. Blurred vision results when fluid causes the macula to swell.
- To improve the retina's circulation, the eye may create new blood vessels on the surface of the retina. These weak, fragile blood vessels can leak blood into the back of the eye and block vision.

In addition to diabetes, other risk factors include high blood pressure, high cholesterol and pregnancy. In addition, studies have shown that patients with diabetes who are of Hispanic or African descent are at an increased risk of developing diabetic retinopathy.

Symptoms
Typically, diabetic retinopathy does not cause noticeable symptoms until significant damage has occurred and complications have developed, which include:
- Blurred or distorted vision, or difficulty reading
- Floaters, which are dark objects that “float” across the field of vision
- Partial or total loss of vision, or a shadow or veil across the field of vision
- Pain within the eye

Diagnosis
Diabetic retinopathy and macular edema are detected during a comprehensive eye exam that includes:
- Visual acuity test: measures how well the eye sees at various distances.
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- Dilated eye exam: drops are placed in the eyes to widen, or dilate, the pupils, and a special magnifying lens is used to examine the retina and optic nerve for signs of damage.\(^2\)
- Optical coherence tomography (OCT): pictures are taken of the retinal layers using an optical scan.\(^8\)
- Tonometry: an instrument that measures pressure inside the eye; numbing drops may be applied.\(^2\)

An ECP will also check the retina for early signs of the disease, including:
- Leaking blood vessels\(^2\)
- Retinal swelling (macular edema)\(^2\)
- Pale, fatty deposits on the retina indicating leaking blood vessels\(^2\)
- Damaged nerve tissue\(^2\)
- Changes to the blood vessels\(^2\)

**Treatment**
There is no cure for diabetic retinopathy; however, treatment is often effective in preventing, delaying or reducing vision loss.\(^1\) Laser treatment (photocoagulation) and surgical removal of the vitreous gel (vitrectomy) can be successful if done before the retina is severely damaged.\(^5\) While laser treatment can provide stabilization of vision in most patients, it generally does not restore sight.\(^9\) More recently, novel treatments (called anti-VEGF drugs) have shown to improve vision in patients with macular edema.\(^7\) People who have been treated for diabetic retinopathy should be monitored frequently by an ECP, as the condition often becomes worse with time and often requires multiple treatments.\(^5\)

**Prevention**
People with diabetes should receive a comprehensive, dilated eye exam at least once a year.\(^2\) Those who already have diabetic retinopathy may need an eye exam more often.\(^2\) People with proliferative retinopathy can reduce their risk of blindness by 95% through timely treatment and appropriate follow-up care.\(^2\)

Diabetic retinopathy can be a problem for pregnant women who have diabetes.\(^2\) To protect vision, women at risk should have a comprehensive dilated eye exam upon confirmation of pregnancy, as well as additional exams during pregnancy as recommended by a doctor.\(^2\)

Most likely, a doctor will recommend that diabetic patients make dietary changes to help control their blood sugar (glucose) levels.\(^2\) Controlling blood sugar levels can also slow the onset and progression of diabetic retinopathy, and reduce the need for sight-saving laser surgery.\(^2\)

Blood sugar control may not be best for everyone, including some elderly patients, children under age 13 or people with heart disease.\(^2\) Patients should ask their doctor if such a control program is right for them.\(^2\)

Other studies have shown controlling elevated blood pressure and cholesterol can also reduce the risk of vision loss and improve overall health.\(^2\)