# Diabetic Retinopathy

The retina is the layer of light-sensitive tissue that lines the back of the eye. It converts light into signals that are sent via the optic nerve to the brain, where they are recognized as images. Conditions that affect the retina affect the ability to see.

Diabetes mellitus is a complex disease that affects many different parts of the body. In diabetic retinopathy, the blood vessels in the retina are affected, leading to loss of vision.

There are two types of diabetic retinopathy (DR).

**Nonproliferative diabetic retinopathy (NPDR)** occurs when the damage to the retinal blood vessels causes them to leak fluid and blood.

**Proliferative diabetic retinopathy (PDR)** occurs when neovascularization, the growth of new, abnormal blood vessels, develops on the retina. These new vessels can led to bleeding and scarring.

## Causes of diabetic retinopathy

The principal factor in the development of DR is high blood sugar (hyperglycemia). The longer a person has diabetes, the more likely it is that DR will develop. High blood pressure (hypertension) and pregnancy are other risk factors. DR is the leading cause of blindness in people of working age.

## Symptoms of diabetic retinopathy

In the early stages of DR, there may be no symptoms. Symptoms may not develop until DR is quite advanced, so it is important for people with diabetes to have regular eye exams even if they have no symptoms. As the disease progresses, symptoms may occur suddenly, or they may develop gradually over time. They include reduced vision, blurred or distorted vision, spots, streaks, or floaters. Severe bleeding can cause serious or even complete loss of vision, as can detachment of the retina caused by scarring.

## Complications of diabetic retinopathy

*Macular edema***.** The macula is the small, central area of the retina that allows sharp, detailed vision, such as that necessary for reading. Blood and fluid leaking into the macula cause swelling, a condition called macular edema, which causes blurring and/or loss of vision.

*Vitreous hemorrhage***.** With neovascularization, the abnormal blood vessels may bleed into the vitreous, the clear, jelly-like substance that fills the inside of the eye. With a small hemorrhage, small spots or clouds, called floaters, may appear in the field of vision. A large hemorrhage may block vision completely.

*Retinal detachment***.** Neovascularization may also lead to the growth of scar tissue on the retina. The scarring can pull the retina way from its normal position, causing retinal detachment.

*Neovascular glaucoma*. New blood vessels in certain parts of the eye can prevent the normal flow of fluid out of

the eye. This can lead to a dangerous increase in pressure that can damage the optic nerve.

*Blindness*. Vitreous hemorrhage, retinal detachment, and neovascular glaucoma can cause complete loss of vision.

## Diagnosis of diabetic retinopathy

People with DR should have regular, thorough eye examinations.

*Ophthalmoscopy*. After the pupils of the eyes are dilated (widened) with the application of eye drops, the retina and the inside of the eye can be examined with an instrument called an ophthalmoscope.

*Fluorescein angiography.* This is a test procedure in which a dye that is injected into a vein in the arm travels to the retinal blood vessels. Special photographs allow the physician to see the vessels and identify abnormalities or leakage.

*Optical coherence tomography (OCT).* OCT uses a thin beam of light and the reflection of that light off the retinal layers to show the anatomy of the retina.

## Treatment of diabetic retinopathy

*Intravitreal injections.* In some cases of DR, a drug is injected into the vitreous through a small needle. The drugs used may include steroids, which reduce inflammation, or drugs that prevent neovascularization.

*Laser treatment.* With laser treatment, a beam of light is used to create small burns on the retina. In focal laser treatment, used for macular edema, burns are placed near the macula to seal the leaking vessels. In scatter or panretinal laser treatment, used for PDR, the burns are placed throughout the retina, except in the area of the macula, to shrink the new vessels and inhibit future neovascularization.

*Vitrectomy.* If vitreous hemorrhage is severe or longstanding, a surgical procedure may be necessary to remove the vitreous, which is replaced with a substitute.

*Retinal reattachment surgery.* If the retina detaches, a surgical procedure is performed to release the tissue pulling the retina and restore the retina to its correct position.

## Prevention of diabetic retinopathy

Research studies have shown that careful control of blood sugar slows the onset and progression of retinopathy and other complications of diabetes. It is important to work with your diabetes doctor to determine the best treatment plan for you.