

DIABETIC RETINOPATHY

DIABETES CAN AFFECT SIGHT

If you have diabetes mellitus, your body does not use and store sugar properly. High blood sugar levels can damage blood vessels in the retina, the nerve layer at the back of the eye that senses light and helps to send images to the brain. The damage to retinal vessels is referred to as diabetic retinopathy.

TYPES OF DIABETIC RETINOPATHY

The two types of diabetic retinopathy are as follows:

- **nonproliferative diabetic retinopathy (NPDR);**
- **proliferative diabetic retinopathy (PDR).**

Nonproliferative diabetic retinopathy, commonly known as **background diabetic retinopathy**, is an early stage of diabetic retinopathy. In this stage, tiny blood vessels within the retina leak blood or fluid. The leaking fluid causes the retina to swell or to form deposits called exudates. Many people with diabetes have mild NPDR, which usually does not affect their vision. When vision is affected it is the result of one or both of the following conditions:

- **Macular edema** is swelling or thickening of the macula, the small area in the center of the retina that allows us to see fine details clearly. The swelling is caused by fluid leaking from retinal blood vessels. It is the most common cause of visual loss in diabetes. Vision loss may be mild to severe, but even in the worst cases, peripheral vision continues to function.
- **Macular ischemia** occurs when small blood vessels (capillaries) close. Vision blurs because the macula no longer receives sufficient blood supply to work properly.

Proliferative diabetic retinopathy is present when abnormal new vessels (neovascularization) begin growing on the surface of the retina or optic nerve. The main cause of PDR is widespread closure of retinal blood vessels. The retina responds by growing new blood vessels in an attempt to supply blood to the area where the original vessels closed. Unfortunately, the new abnormal blood vessels do not resupply the retina with normal blood flow. The new vessels are often accompanied by scar tissue that may wrinkle or pull on the retina. Unlike NPDR, proliferative diabetic retinopathy can affect both central and peripheral vision. PDR causes visual loss in the following ways:

- **Vitreous hemorrhage:** The fragile new vessels may bleed into the vitreous, the gel-like substance that fills the center of the eye. If the vitreous hemorrhage is small, a person might see only a few new, dark floaters. A very large hemorrhage might block out all vision. It may take days, months, or even years to reabsorb the blood, depending on the amount of blood present. If the eye does not clear the vitreous blood adequately within a reasonable time, vitrectomy surgery may be recommended. Vitreous hemorrhage alone does not cause permanent vision loss. When the blood clears, vision may return to its former level unless the macula is damaged.
- **Tractional retinal detachment:** When PDR is present, the scar tissue associated with the neovascularization can shrink and pull on the retina. Mild pulling on the macula will distort vision. Marked pulling on the retina can lead to a tractional retinal detachment, with a substantial loss of vision.
- **Neovascular glaucoma:** Occasionally, extensive retinal vessel closure will cause new, abnormal blood vessels to grow on the iris (colored part of the eye) and in the drainage angle in the front part of the eye. This can block the normal flow of fluid out of the eye. Pressure in the eye builds up, resulting in neovascular glaucoma, a severe form of glaucoma that causes damage to the optic nerve.

HOW IS DIABETIC RETINOPATHY DIAGNOSED?

An ophthalmologist can often diagnose and treat serious diabetic retinopathy before you are aware of any vision problems. The ophthalmologist dilates your pupil and looks inside the eye with special equipment and lenses. If diabetic retinopathy is found, color photographs of the retina or a special test called **fluorescein angiography** helps determine if treatment is needed. In this test, a fluorescent dye is injected into a vein in your arm. It flows throughout the blood vessels in your body and illuminates them. As the dye passes through the blood vessels in your eye, a special camera takes photographs of the retina. Abnormal retinal blood vessels and leakage of fluid from these vessels can be seen.

HOW IS DIABETIC RETINOPATHY TREATED?

The best treatment is to prevent the development of retinopathy as much as possible. Strict control of your blood sugar will significantly reduce the long-term risk of vision loss from diabetic retinopathy. If high blood pressure and kidney problems are present, they need to be treated.

Medical Treatment: In certain cases, your ophthalmologist may choose to treat your macular edema with injections of medicine in your eye. One type of medication is called “anti-VEGF” medication. This helps to reduce swelling of the macula, slowing vision loss and perhaps improving vision. This drug is given by injections (shots) in the eye. Steroid medicine is another option to reduce macular swelling. This is also given as injections in the eye. Your doctor will recommend how many medication injections you will need over time.

Laser surgery: Laser surgery is often recommended for people with macular edema, PDR, and neovascular glaucoma. For macular edema, the laser is focused on the damaged retina near the macula to decrease the fluid leakage. The main goal of treatment is to prevent further loss of vision. It is uncommon for people who have blurred vision from macular edema to recover normal vision, although some may experience partial improvement. A few people may see the laser spots near the center of their vision following treatment. The spots usually fade with time but may not disappear. For PDR, the laser is focused on all parts of the retina except the macula. This “panretinal photocoagulation” treatment causes abnormal new vessels to shrink and often prevents them from growing in the future. This decreases the chance that vitreous bleeding or traction on the retina will occur. Multiple laser treatments over time are sometimes necessary. Laser surgery does not cure diabetic retinopathy and does not always prevent further loss of vision.

Vitrectomy: In advanced PDR, your ophthalmologist may recommend a vitrectomy. During this microsurgical procedure, which is performed in the operating room, the blood-filled vitreous is removed and replaced with a clear solution. Your ophthalmologist may wait for several months to see if the blood clears on its own before performing a vitrectomy. A vitrectomy often prevents further bleeding by removing the abnormal vessels that caused the bleeding. If the retina is detached, it can be repaired during the vitrectomy surgery. Surgery should usually be done early because a distortion of the macula or a tractional retinal detachment will cause permanent visual loss. The longer the macula is distorted or out of place, the more serious the vision loss will be.

Vision loss is largely preventable

If you have diabetes, it is important to know that today, with improved methods of diagnosis and treatment, a smaller percentage of people who develop retinopathy have serious vision problems. Early detection of diabetic retinopathy is the best protection against loss of vision. You can significantly

lower your risk of vision loss by maintaining strict control of your blood sugar and visiting your ophthalmologist regularly.

When to schedule an examination

People with diabetes should schedule examinations at least once a year. More frequent medical eye examinations may be necessary after a diagnosis of diabetic retinopathy. Pregnant women with diabetes should schedule an appointment in the first trimester, because retinopathy can progress quickly during pregnancy. If you need to be examined for eyeglasses, it is important that your blood sugar be consistently under control for several days when you see your ophthalmologist. Eyeglasses that work well when blood sugar is out of control will not work well when blood sugar is stable. Rapid changes in blood sugar can cause fluctuating vision in both eyes even if retinopathy is not present.