

Early detection and treatment of diabetic retinopathy can reduce severe visual loss by 60%. **Since many patients with diabetic retinopathy are asymptomatic at the treatable stage of their disease, it is critical to have a dilated retinal exam shortly after diagnosis of diabetes and then at least annually.** This handout outlines a review of the incidence, types and treatment of diabetic retinopathy.

With the recent increase in the life span of diabetic patients, the incidence of diabetic retinopathy has also increased. It is now the **most common cause of blindness under age 65** in the United States. Many risk factors have been associated with the development of diabetic retinopathy, but the duration of diabetes is the most important single risk factor. Patients with diabetes for 4 years or less have a 15% incidence of retinopathy whereas; **patients with diabetes for 15 or more years have a 90% incidence of retinopathy.**

The two types of diabetic retinopathy are nonproliferative, or background diabetic retinopathy, and proliferative diabetic retinopathy.

Nonproliferative diabetic retinopathy (NPDR) is the most common form of diabetic retinopathy, accounting for 80% of all diabetic retinopathy. Although it rarely results in total blindness, 5-20% of these patients will become legally blind without treatment within five years. In the early stages, the retinal findings consist of microaneurysms, hemorrhages and increased vascular permeability, resulting in macular edema and hard exudates in the central retina. Many patients with vision threatening macular edema are asymptomatic and have good vision. Therefore, it is essential to diagnose and treat these patients at an early stage. Diabetic macular edema is more likely to occur with longer duration of disease, poorly controlled blood glucose, elevated lipids and protein in the urine. In the later stages of NPDR retinal ischemia may occur. The ischemia is caused by inadequate blood flow in the retina and may involve closure of small, superficial capillaries producing cotton wool spots. Extensive closure of blood vessels can cause vision loss or new blood vessel growth called neovascularization.

Proliferative diabetic retinopathy (PDR) is a less common (20%) but a more severe form of diabetic retinopathy. Over a 5 year period, 50% of these patients will become legally blind without treatment. In the early stages, new vessels grow (proliferate) on the surface of the optic nerve and retina. As in nonproliferative diabetic retinopathy, many patients are asymptomatic despite extensive neovascularization.

Hemorrhage, contraction of the vitreous gel and fibrovascular membrane formation may cause retinal detachment, glaucoma and blindness.

Treatment: The first **treatment for diabetic macular edema** is often laser photocoagulation (**focal laser**). This treatment, is done on an outpatient basis under topical anesthesia. The energy from the laser seals areas of vascular leakage and significantly reduces the progression and incidence of severe visual loss. Laser treatment is sometimes augmented by using of medications, like steroids or growth factor inhibitors. These medications are injected in or around the eye. Multiple treatments with laser and medications are needed sometimes but treatment is usually successful.

Laser is also the primary **treatment for proliferative diabetic retinopathy**. Neovascularization (new blood vessel growth) on the optic nerve or on the surface of the retina are treated by photocoagulation of the peripheral retina (**panretinal photocoagulation**). Treatment is done on an outpatient basis with local anesthesia in one or two sessions. Laser photocoagulation has proven extremely effective in reducing the incidence of severe visual loss.

When **vitreous hemorrhage** or **retinal detachment** result from proliferative diabetic retinopathy, vitreous surgery (**vitrectomy**) may be necessary. In this procedure, small instruments are inserted into the eye and under microscopic visualization the hemorrhage and membranes are removed. Approximately 60% of

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patients have visual improvement following vitrectomy.

What Can You Do? Early diagnosis leads to early treatment. Good metabolic control can minimize the onset and severity of damage to the eyes. Target values assigned for the important parameters are listed below.

H_{A1c} is a blood test that measures the average blood sugar level during the preceding 90 days. It is often measured once a quarter until the diabetes has stabilized. There is no safe number but values less than 6.5 are indicative of good control.

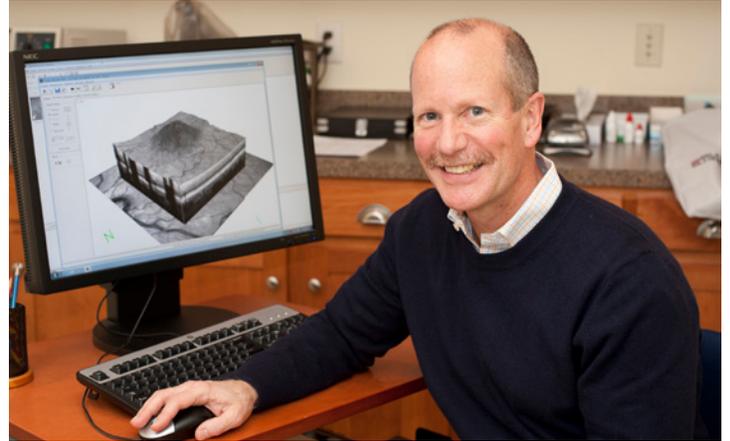
Blood pressure should be maintained at or as close to normal as possible. Normal blood pressure is now defined as 125/75.

Hyperlipidemia is commonly associated with diabetes. It can lead to deposits of exudates in the retina with subsequent scarring and loss of vision. Lipid panels are measured by blood testing after a 12-hour fast. Values in the low normal range are desirable.

Excess body weight is more likely to lead to diabetes and more likely to make it difficult to maintain good blood sugars in patients with diabetes.

Daily exercise has many benefits. It makes it easier to control the other metabolic parameters listed above. Walking is a wonderful way for adults to exercise. Working up to the point that you can walk 3 miles a day will go a long way to maintaining your health. Be sure to wear comfortable shoes and check your feet for cuts or blisters. Someday we will find a cure for diabetes. Until then, these simple measures will help control the damage done by the disease to your eyes.

Summary: Although we cannot prevent the occurrence of diabetic retinopathy, good medical control and early diagnosis and treatment can significantly slow progression to severe vision loss. Dilated retinal examinations are needed at least once a year, patients at higher risk need to be seen more often.



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