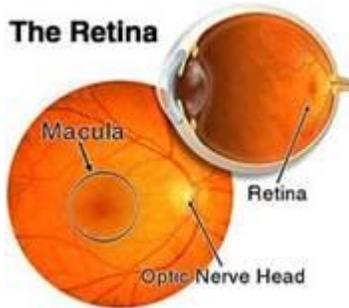


Diabetic Retinopathy

What is Diabetic Retinopathy



Diabetic retinopathy is one of the leading causes of blindness world-wide. Diabetes damages blood vessels in many organs of the body including the eyes. In some people with diabetic retinopathy, blood vessels may swell and leak fluid. In other people, abnormal new blood vessels grow on the surface of the retina. The retina is the light-sensitive tissue at the back of the eye. A healthy retina is necessary for good vision.

If you have diabetic retinopathy, at first you may not notice changes to your vision. But over time, diabetic retinopathy can get worse and cause vision loss. Diabetic retinopathy usually affects both eyes.

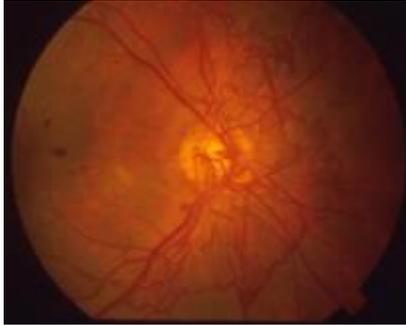
What are the stages of diabetic retinopathy?

Diabetic retinopathy has 4 stages:

1. **Mild Nonproliferative Diabetic Retinopathy.** At this earliest stage, microaneurysms occur. They are small areas of balloon-like swelling in the retina's tiny blood vessels.
2. **Moderate Nonproliferative Diabetic Retinopathy.** As the disease progresses, some blood vessels that nourish the retina are blocked.
3. **Severe Nonproliferative Diabetic Retinopathy.** Many more blood vessels are blocked, depriving several areas of the retina with their blood supply. These areas of the retina send signals to the body to grow new blood vessels for nourishment.
4. **Proliferative Diabetic Retinopathy.** At this advanced stage, the signals sent by the retina for nourishment trigger the growth of new blood vessels. This condition is called proliferative retinopathy. These new blood vessels are abnormal and fragile. They grow along the retina and the surface of the clear, vitreous gel that fills the inside of the eye. By themselves, these blood vessels do not cause symptoms or vision loss. However, they have thin, fragile walls. If they leak blood, severe vision loss and even blindness can result.

How does diabetic retinopathy cause vision loss?

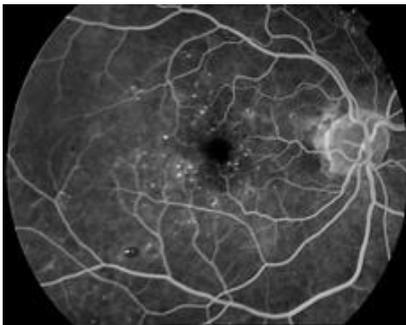
Blood vessels damaged from diabetic retinopathy can cause vision loss in 3 ways



Vitreous Hemorrhage. Bleeding into the cavity of the eye from fragile, abnormal blood vessels that break. These new blood vessels may also pull on the retina causing a retinal detachment. This is **proliferative diabetic retinopathy** and is the fourth and most advanced stage of the disease.



Macular Edema. Fluid can leak into the center of the macula, the part of the retina responsible for our sharp, central vision. The fluid makes the macula swell, blurring vision. It can occur at any stage of diabetic retinopathy, although it is more likely to occur as the disease progresses.



Macular ischemia. As the disease progresses, loss or damage to blood vessels in the centre of the macula may lead to loss of central vision. This is an irreversible cause of vision loss.

Who is at risk for diabetic retinopathy?

All people with diabetes – both type 1 and type 2 – are at risk. This is why everyone with diabetes should have a comprehensive dilated eye exam at least once a year. The longer someone has diabetes, the more likely he or she will get diabetic retinopathy. If you have diabetic retinopathy, your doctor can recommend treatment to help prevent its progression.

During pregnancy, diabetic retinopathy may be a problem for women with diabetes. To protect vision, every pregnant woman with diabetes should have a comprehensive dilated eye exam as soon as possible. Your doctor may recommend additional exams during your pregnancy.

What can I do to protect my vision?

If you have diabetes, get a comprehensive dilated eye exam at least once a year and remember:

- Proliferative diabetic retinopathy can develop without symptoms. At this advanced stage, you are at high risk for vision loss.
- Macular edema can develop without symptoms at any of the four stages of diabetic retinopathy.
- You can develop both proliferative diabetic retinopathy and macular edema and still see fine. However, you are at high risk for vision loss.
- Your eye care professional can tell if you have macular edema or any stage of diabetic retinopathy. Whether or not you have symptoms, early detection and timely treatment can prevent vision loss.

If you have diabetic retinopathy damage already, you may need an eye exam more often. People with proliferative diabetic retinopathy can reduce their risk of vision loss with treatment and appropriate follow-up care.

The Diabetes Control and Complications Trial (DCCT) showed that better control of blood sugar levels slows the onset and progression of diabetic retinopathy. People with diabetes who kept their blood sugar levels as close to normal as possible also had much less kidney and nerve disease. Better control also reduces the need for sight-saving laser surgery.

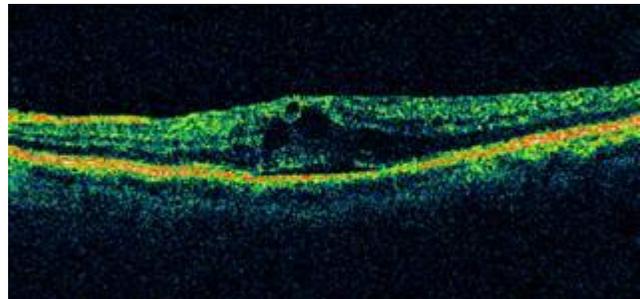
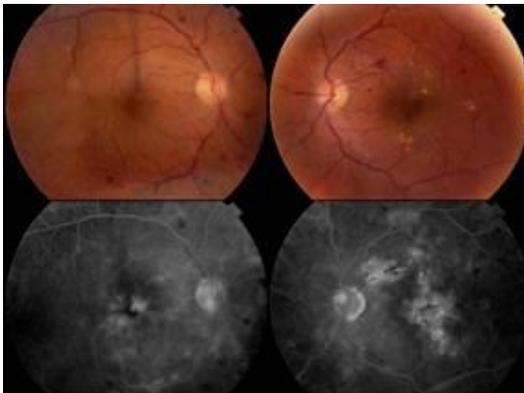
This level of blood sugar control may not be best for everyone, including some elderly patients, children under age 13 years old, or people with heart disease. Be sure to ask your doctor if such a control program is right for you.

Other studies have shown that controlling elevated blood pressure and cholesterol can reduce the risk of vision loss. Controlling these will help your overall health as well as help protect your vision.

Does diabetic retinopathy have any symptoms?

There are often no symptoms in the early stages of the disease, nor is there any pain. **Don't wait for symptoms.** Be sure to have a comprehensive dilated eye exam at least once a year.

Blurred vision may occur when the macula – the part of the retina that provides sharp, central vision – swells from leaking fluid. This condition is called macular edema.



If new blood vessels grow on the surface of the retina, they can bleed into the eye and reduce vision

What are the symptoms of proliferative diabetic retinopathy if bleeding occurs?

At first, you will see a few specks of blood, or spots, "floating" in your vision. If spots occur, see your eye care professional as soon as possible. You may need treatment before more serious bleeding occurs. Bleeding tends to happen more than once, often during sleep.

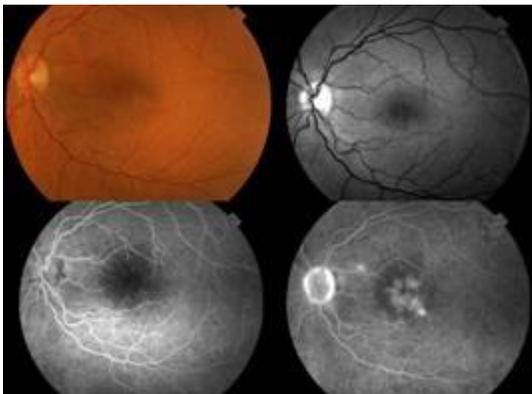
Sometimes the floaters clear without treatment and your vision may improve spontaneously. However, bleeding can reoccur and cause severe vision loss. You need to be examined by your eye care professional at the first sign of blurred vision, before more bleeding occurs.

If left untreated, proliferative diabetic retinopathy can cause severe vision loss and even blindness. Also, the earlier you receive treatment, the more likely treatment will be effective.

How are diabetic retinopathy and macular edema detected?



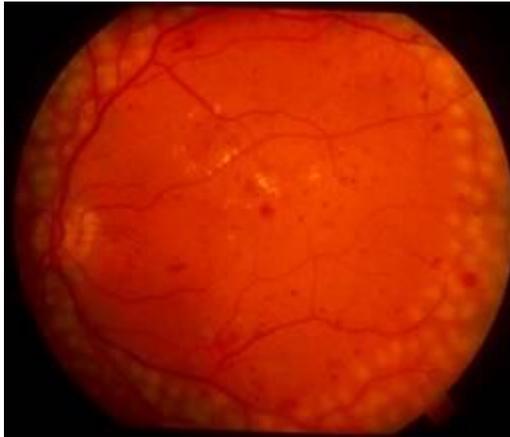
Diabetic retinopathy and macular edema are detected during a dilated eye exam. Certain tests are sometimes needed to assess the degree of circulation damage in the retina if certain abnormalities are detected on the dilated eye exam. A **fluorescein angiogram** may be ordered at the hospital. In this test, a special dye is injected into your arm. Pictures are taken as the dye passes through the blood vessels in your retina. The test allows your eye care professional to identify any leaking blood vessels and recommend treatment.



Also, more advanced retinal imaging with **Optical Coherence Tomography (OCT)** is often recommended to visualize the cross-sectional profile of the retina.

Treatment

How is diabetic retinopathy treated?



During the first three stages of diabetic retinopathy, no treatment is needed, unless you have macular edema. To prevent progression of diabetic retinopathy, people with diabetes should control their levels of blood sugar, blood pressure, and blood cholesterol.

Proliferative diabetic retinopathy is treated with laser surgery. This procedure is called panretinal photocoagulation (PRP). PRP laser treatment helps induce regression of the abnormal blood vessels by placing 1000 to 2000 laser burns in the areas of the retina away from the macula. Because a high number of laser burns are necessary, 4 sessions usually are required to complete treatment. Although you may notice some loss

of your side vision, PRP laser treatment can save the rest of your sight, in particular, the important sharp, central vision. PRP laser treatment may slightly reduce your color vision, night vision, and in 10% of patients cause mild central vision loss.

PRP laser treatment works better before the fragile, new blood vessels have started to bleed. That is why it is important to have regular, comprehensive dilated eye exams. Even if bleeding has started, PRP laser treatment may still be possible, depending on the amount of bleeding.

Other treatments may be offered in conjunction to laser PRP. These include the injection of medications into the vitreous cavity of the eye, such as anti-vascular endothelial growth factor (anti-VEGF) agents or steroids.

If the bleeding is severe or unresponsive to laser treatment, you may need a surgical procedure called a vitrectomy. During a vitrectomy, blood is removed from the center of your eye.

How is macular edema treated?

The mainstay for treatment of DME involving the center of the macula is the injection of anti-VEGF agents into the eye. Ranibizumab (Lucentis) and Aflibercept (Eylea) are approved for use in the eye in patients with DME. It is important to understand that these injections are meant as a treatment to control the disease and help stabilize and in some cases improve vision. It is not a cure and repeated injections, as often as 4 to 6 weeks or at various intervals, may be necessary over time. Injection of steroids into the eye may be offered in some cases as well.

Macular photocoagulation is a gentle, painless, laser procedure where small laser burns are applied to areas of macular edema. These burns slow the leakage of fluid and reduce the amount of fluid in the retina. The surgery is usually completed in one session. It is mostly offered to patients with DME that is not involving the centre of the macula. The goal of laser treatment is to stabilize vision. In fact, laser treatment reduces the risk of vision loss by 50 percent. If you have macular edema in both eyes and require laser therapy, generally only one eye will be treated at a time, usually several weeks apart.

Vitreotomy surgery may be required for severe cases of DME that persist despite medical therapy.

Please note that in some patients with diabetes, vision loss can continue despite treatment. This can occur due to a progressive decline in the circulation to the retina or persistent macular edema. A special test called a fluorescein angiogram where a vegetable dye is injected into the vein of the arm and photographs are taken of the back of the eye as the dye travels through the circulation, will often be performed prior to treatment to help assess the prognosis and guide therapy. Control of blood glucose, blood pressure and cholesterol will help in the overall management of the disease. Follow-up with your primary care physician is very important in this regard.

What happens during laser treatment?

Both macular and PRP laser treatment are performed in the eye clinic. Before the surgery, drops are applied to dilate your pupil and numb the eye. As you sit facing the laser machine, your doctor will hold a special lens to your eye. During the procedure, you may see flashes of light. These flashes eventually may create a stinging sensation that can be uncomfortable. You may need someone to drive you home after the laser surgery. Because your pupil will remain dilated for a few hours, you should bring a pair of sunglasses.

For the rest of the day, your vision will probably be a little blurry. If your eye hurts, your doctor can suggest treatment.

Laser treatment and appropriate follow-up care can reduce the risk of blindness. However, laser often cannot restore vision that has already been lost. This is why assessing for diabetic retinopathy early is the best way to prevent vision loss.

What is a vitrectomy?

If you have a lot of blood in the center of the eye (vitreous gel), you may need a vitrectomy to remove the blood and restore your sight. If you need vitrectomy surgery in both eyes, they are usually done several weeks apart.

A vitrectomy is performed under either local or general anesthesia. Your doctor makes a tiny incision in your eye. Next, a small instrument is used to remove the vitreous gel that is clouded with blood. The vitreous gel is replaced with a balanced salt solution. Because the vitreous gel is mostly water, you will notice no change between the salt solution and the original vitreous gel.

You will probably be able to return home after the vitrectomy. Your eye will be red and sensitive. You will need to wear an eye patch for a few days or weeks to protect your eye. You also will need to use medicated eye drops to protect against infection.

Once you have proliferative diabetic retinopathy, you always will be at risk for new bleeding. You may need treatment more than once to protect your sight.

What can I do if I already have lost some vision from diabetic retinopathy?

If you have lost some sight from diabetic retinopathy, ask your eye care professional about low vision services and devices that may help you make the most of your remaining vision. Ask for a referral to a specialist in low vision.