

Optic Trade Magazine Article

“Diabetes & Retina”

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How can diabetes affect eye?

Diabetes can affect the eyes and vision in a number of ways. It may lead to frequent fluctuations in vision, cataract in young age, decreased vision due to involvement of optic nerve, temporary paralysis of the muscles controlling the movement of eyes and thus double vision. The most significant complication of diabetes in eye is diabetic retinopathy and its complications.

What is diabetic retinopathy?

Retina is the layer at the back of the eye that is sensitive to light. Diabetes affects the small vessels of the retina in the eye. There are various stages of diabetic retinopathy:

Non-proliferative or background diabetic retinopathy: When blood vessels in the retina are damaged, they can leak fluid or bleed. This causes the retina to swell and form deposits called exudates. This is an early form of diabetic retinopathy and may not lead to any decrease in vision, but it can lead to other more serious forms of retinopathy that affect the vision.

Macular edema: The fluid and exudates collect in the macula (the part of the retina that allows us to see fine details), thus decreasing the vision. Sometimes there may be a macular edema without any loss of vision. Therefore it is important to have periodic checkup to detect and treat these conditions at an early stage. (Photo Attached)

Proliferative diabetic retinopathy: This is an advanced stage of diabetic retinopathy, where the blood supply of retina is compromised. In response to this, new fragile blood vessels grow on the surface of the retina (neovascularization). These new vessels are very fragile and bleed easily. These may lead to serious vision problems if they bleed into the vitreous (the clear, jelly-like substance that fills the center of the eye) which is known as vitreous hemorrhage. This prevents the light from reaching the retina and thus can blur the vision. (Photo Attached)

The new blood vessels and the bleed into the vitreous can also cause scar tissue to develop, which can pull the retina away from the back of the eye. This is known as retinal detachment, and can lead to blindness if untreated.

In addition, abnormal blood vessels can grow on the iris (the colored part in the front of your eye, which can lead to glaucoma).

What are the risk factors for diabetic retinopathy?

The longer the person has diabetes, the greater are his/her chances to develop diabetic retinopathy. Almost 80% of people, who have diabetes for 15 years or more, have some damage to the blood vessels in their retina. The other risk factors are high blood pressure, anemia, kidney diseases, and pregnancy.

Can something be done to prevent diabetic retinopathy?

There is no treatment that can prevent diabetic retinopathy altogether. Persons with any form of diabetes may develop diabetic retinopathy. But it has been proven that a good control of diabetes can delay and slow down the rate of progress of diabetic retinopathy and its complications. Besides a good control of blood sugar, one must exercise regularly, keep the blood pressure under control, avoid smoking, and avoid obesity.

How do I know if I have diabetic retinopathy?

You might not know that you are having diabetic retinopathy, as there are no symptoms in the earlier stages of the disease. Therefore it is essential to have periodic evaluation of your eye by an ophthalmologist to detect the condition early. Early diagnosis and timely treatment is very essential in preventing the complications of this disease and thus maintaining vision.

How frequently should I get my eye examined?

If you have diabetes, you should get a yearly examination with your ophthalmologist. Your pupils may be dilated with eye drops, so that your ophthalmologist may have a good look at the back of your eye. Once you develop diabetic retinopathy, then your ophthalmologist will advise you if you need some investigations, treatment or just need to follow up. In these cases the frequency of follow up visits is decided on basis of the severity of the disease.

Part 2

What are the tests done for diabetic retinopathy?

Your vision is assessed by the usual charts. The back of your eye is examined after dilating your pupils, using an instrument called ophthalmoscope. Sometimes your ophthalmologist may advise a special test called Fluorescein angiography and / or Optical coherence tomography (OCT).

Visual acuity test: This test uses an eye chart to measure how well a person sees at various distances (i.e., visual acuity).

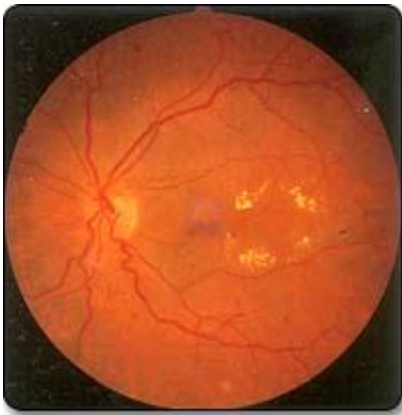
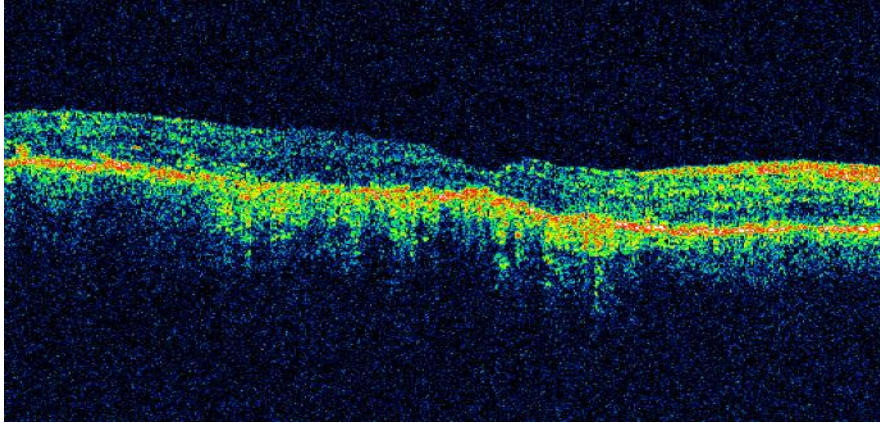
Pupil dilation: The eye care professional places drops into the eye to widen the pupil. This allows him or her to see more of the retina and look for signs of diabetic retinopathy. After the examination, close-up vision may remain blurred for several hours.

Ophthalmoscopy: This is an examination of the retina in which the eye care professional: (1) looks through a device with a special magnifying lens that provides a narrow view of the retina, or (2) wearing a headset with a bright light, looks through a special magnifying glass and gains a wide view of the retina. Note that hand-held ophthalmoscopy is insufficient to rule out significant and treatable diabetic retinopathy.

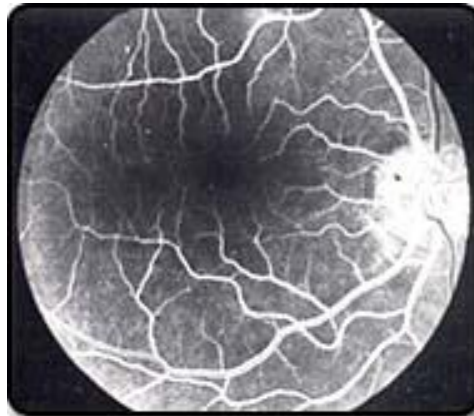
Slit Lamp Biomicroscopy: The eye care professional will look at the retina for early signs of the disease, such as: (1) leaking blood vessels, (2) retinal swelling, such as macular edema, (3) pale, fatty deposits on the retina (exudates) – signs of leaking blood vessels, (4) damaged nerve tissue (neuropathy), and (5) any changes in the blood vessels.

Optical coherence tomography (OCT): This is an optical imaging modality based upon interference, and analogous to ultrasound. It produces cross-sectional images of the retina (B-scans) which can be used to measure the thickness of the retina and to resolve its major layers, allowing the observation of swelling and or leakage.

Fundus Fluorescein angiography (FFA): Should the doctor suspect macular edema, he or she may perform a test called fluorescein angiography. In this test, a special dye is injected into the arm. Pictures are then taken as the dye passes through the blood vessels in the retina. This test allows the doctor to find the leaking blood vessels.



**Macular Edema
Diagnosis**



Normal Fluorescein Angiography



Proliferative Diabetic Retinopathy

How is diabetic retinopathy treated?

Laser

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 retinopathy is treated with laser surgery. This procedure is called scatter laser treatment. Scatter laser treatment helps to shrink the abnormal blood vessels. Your doctor places

1,000 to 2,000 laser burns in the areas of the retina away from the macula, causing the abnormal blood vessels to shrink. Because a high number of laser burns are necessary, two or more sessions usually are required to complete treatment. Although you may notice some loss of your side vision, scatter laser treatment can save the rest of your sight. Scatter laser treatment may slightly reduce your color vision and night vision.

Scatter 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, scatter laser treatment may still be possible, depending on the amount of bleeding.

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

What happens during laser treatment?

Both focal and scatter laser treatment are performed in your doctor's office or eye clinic. Before the surgery, your doctor will dilate your pupil and apply drops to numb the eye. The area behind your eye also may be numbed to prevent discomfort.

The lights in the office will be dim. 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 will need someone to drive you home after 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 surgery and appropriate follow-up care can reduce the risk of blindness by 90 percent. However, laser surgery often cannot restore vision that has already been lost. That is why finding diabetic retinopathy early is the best way to prevent vision loss.

What is the role of intravitreal steroid injection ?

Steroids have both anti-inflammatory and anti-angiogenic properties; because of these properties, they are increasingly becoming a popular therapeutic option in retinal practice. Intravitreal steroids can be used in the treatment of various retinal conditions including diabetic and vasculo-occlusive macular edema, exudative macular degeneration, pseudophakic cystoid macular edema, and posterior uveitis.¹ Although there are well known serious potential complications with intravitreal steroids, including glaucoma and cataracts, recent studies have shown that intravitreal steroids may be used as a safe alternative to the standard practice of laser therapy for the treatment of macular edema secondary to diabetes

What is the role of Anti VEGF in Diabetic eye disease ?

Vascular endothelial growth factor (VEGF) plays a key role in the development of both proliferative diabetic retinopathy (PDR) and diabetic macular oedema (DMO). In recent years, anti-VEGF agents have emerged as new approaches to the treatment of these devastating diabetic complications. Although Phase III studies in the diabetic population are needed, intravitreal anti-VEGF therapy is currently being used in clinical practice. Intravitreal injection is an effective means of delivering anti-VEGF drugs to the retina. However, this is an invasive procedure associated with potentially serious complications, such as endophthalmitis or retinal detachment, which may be significant for patients requiring serial treatment over many years. In addition, although delivered within the vitreous, anti-VEGF drugs could pass into the systemic circulation, which could potentially result in hypertension, proteinuria, increased cardiovascular events and impaired wound healing. Pegaptanib, ranibizumab and bevacizumab are the currently available anti-VEGF agents. Ranibizumab and bevacizumab block all VEGF isoforms, thus impairing both physiological and pathological neovascularisation. Pegaptanib only blocks the VEGF(165) isoform, and would therefore seem the best option for avoiding systemic adverse effects in diabetic patients, although this remains to be demonstrated in clinical trials. In this regard, head-to-head studies designed to evaluate not only the efficacy, but also the systemic adverse effects of these drugs in a high-risk population such as diabetic patients are warranted.

What is the role of Vitrectomy surgery?

Instead of laser surgery, some people require a vitrectomy to restore vision. A vitrectomy is performed when there is a lot of blood in the vitreous. It involves removing the cloudy vitreous and replacing it with a saline solution.

Studies show that people who have a vitrectomy soon after a large hemorrhage are more likely to protect their vision than someone who waits to have the operation. Early vitrectomy is especially effective in people with insulin-dependent diabetes, who may be at greater risk of blindness from a hemorrhage into the eye.

Vitrectomy is often done under local anesthesia. The doctor makes a tiny incision in the sclera, or white of the eye. Next, a small instrument is placed into the eye to remove the vitreous and insert the saline solution into the eye.

Patients may be able to return home soon after the vitrectomy, or may be asked to stay in the hospital overnight. After the operation, the eye will be red and sensitive, and patients usually

need to wear an eyepatch for a few days or weeks to protect the eye. Medicated eye drops are also prescribed to protect against infection