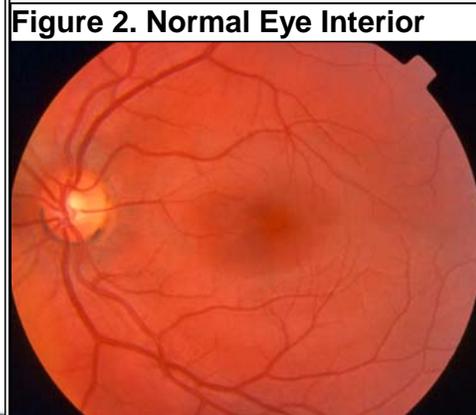
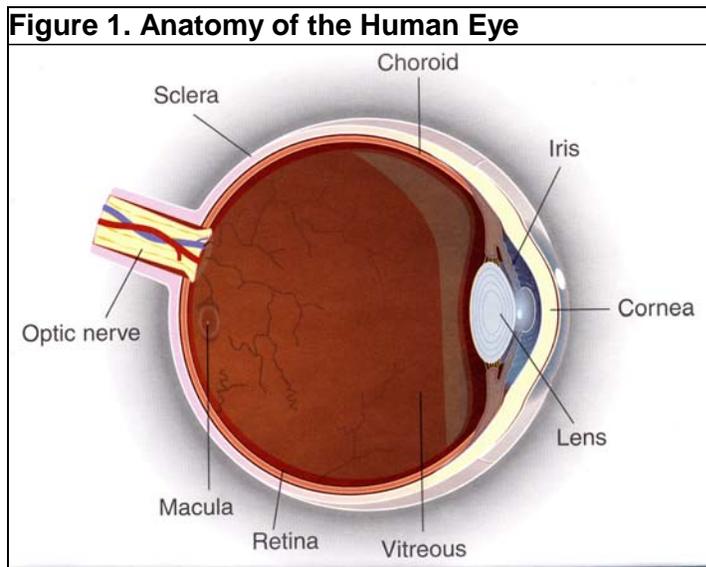


# What You Should Know About Proliferative Diabetic Retinopathy

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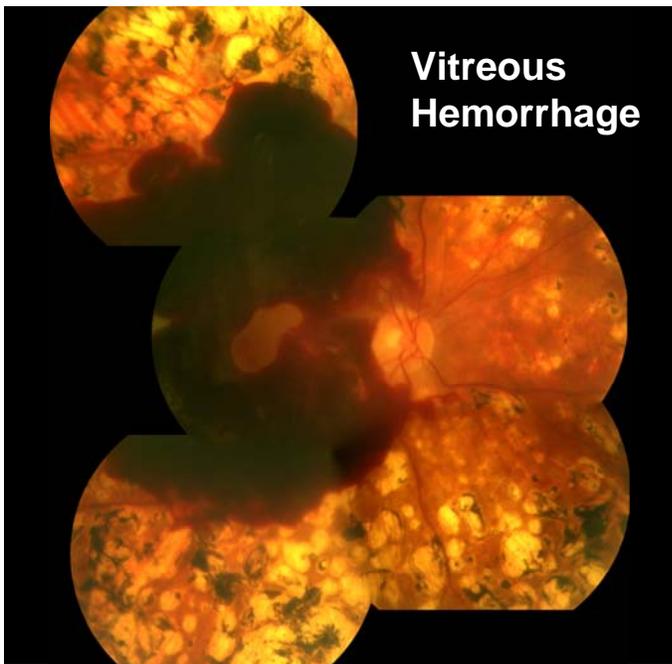
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Proliferative diabetic retinopathy is the most severe stage of diabetic retinopathy in which abnormal blood vessels arise from the normal blood vessels of the retina. The retina is the neural lining of the back of the eye. Light travels through the pupil, is focused by the lens, and travels to the retina where the light energy is converted into a nerve signal that travels to the brain. Figure 1 shows these normal structures of the eye. Figure 2 shows how the normal eye looks to the ophthalmologist examining the patient.

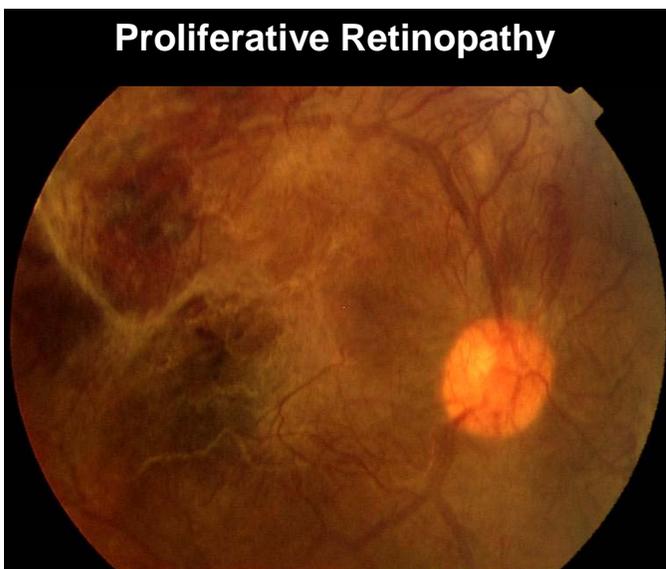


After many years of diabetes mellitus, the chronically elevated blood glucose leads to abnormal changes in the retina. The blood vessels become leaky, dilated, and sausage-shaped. The capillaries close off in parts of the retina, starving the retinal tissue of oxygen. A tissue response to hypoxia (low oxygen) is to produce chemicals that cause blood vessels to sprout. The major chemical in this process is vascular endothelial growth factor (VEGF). The abnormal sprouting blood vessels are fragile and can break and bleed into the vitreous gel filling the eye, a condition called a vitreous hemorrhage. Because the vitreous is so viscous, such a

hemorrhage can take a long time to clear. Figure 3 (below) shows an example of a vitreous hemorrhage.



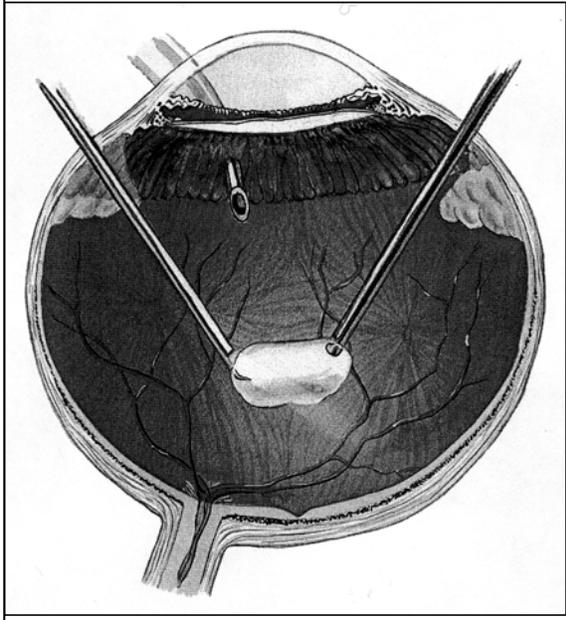
When abnormal blood vessels grow on the surface of the retina, they deposit collagen and produce scars that can contract, pull on the retina, and detach it from the back of the eye, a condition called a traction retinal detachment. Figure 4 (below) shows an eye with both abnormal blood vessels and scar tissue causing a traction retinal detachment.



## What Can Be Done For Proliferative Diabetic Retinopathy?

All patients with diabetes need yearly dilated eye exams by an ophthalmologist. When the changes of diabetic retinopathy are detected, the need for exams becomes more frequent. At a certain stage, the ophthalmologist recommends laser photocoagulation to slow down the progression. In laser photocoagulation, the retina is burned by the laser light. This reduces the amount of VEGF produced by the diseased retina, and slows or even stops the growth of the abnormal vessels. Sometimes laser treatment alone is insufficient to stop the process. In such cases, an operation called a vitrectomy is recommended. In a vitrectomy, 3 small incisions are made in the white wall of the eye (the sclera). Small instruments are introduced under microscopic guidance, and the retina specialist cuts away the bloody vitreous, scar tissue, and abnormal blood vessels, replacing it with a sterile saline solution. Figure 5 illustrates the concept of a vitrectomy.

**Figure 5. Illustration of Vitrectomy**



At all stages of diabetic retinopathy, the foundation of a successful treatment plan is good control by the patient of blood sugar, blood pressure, and serum fats. Avoidance of smoking is important. Maintenance of a normal body weight and regular exercise help meet these goals. Laser treatment and vitrectomy surgery should be considered backup, salvage therapies when the foundational steps fail.

### **Prognosis in Proliferative Diabetic Retinopathy**

It is common for patients with proliferative diabetic retinopathy to have some visual loss, but with regular eye examination and timely treatment, it is rare to lose all vision. Blindness almost always implies that the patient fell through the cracks and missed screening examinations over a long period of time while control of blood sugar and blood pressure was poor. The overall message, therefore, is a hopeful one. A patient with

diabetes has a large measure of control over his or her visual fate. The help of many people is needed – internists, family doctors, dieticians, exercise trainers, podiatrists and orthopedists, and ophthalmologists. With personal discipline and help from these people, the outlook for patients with diabetes gets brighter all the time, until an actual cure for this chronic disease is discovered.

After reading this brochure, we welcome you to browse the rest of our website. There is also a forum available on the site, where patients can read about the experiences other patients have had and share their own experiences if they choose to do so. An additional resource we recommend is the website for the National Library of Medicine, on which there is a diverse collection of medical publications. We have included a link to this site on our website, but it can also be directly accessed via [www.pubmed.com](http://www.pubmed.com).