VITREOUS HEMORRHAGE

Approximately 2/3 of the total volume of the eye is occupied by the vitreous gel. The vitreous gel is a semisolid or liquid substance that occupies the space between the lens in the front of the eye and the retina lining the back of the eye. The vitreous gel, under normal circumstances, is colorless and highly transparent permitting the eye to produce crystal clear vision. The vitreous gel is made up primarily of water (99%) and has only 1% solid, chemical and protein constituents. There are normally no blood vessels within the vitreous gel. Abnormal blood vessels can grow into the vitreous gel in a variety of eye diseases, most commonly diabetic retinopathy. There are, of course, many blood vessels surrounding the vitreous gel, primarily in the region of the optic nerve, the retina itself and other structures of the eye surrounding the lens. A vitreous hemorrhage occurs when a blood vessel ruptures and bleeds within the vitreous gel or near the vitreous cavity. Blood can then enter into the clear vitreous gel producing visual symptoms.

The initial symptoms of a sudden vitreous hemorrhage result from a sudden increase in the number and size of vitreous floaters. Normal benign, age-related vitreous floaters are related to protein clumping within the vitreous gel, and are usually described as thin, transparent lines and dots that float in and out of the field of vision associated with eye movement. Abnormal bleeding into the vitreous gel, however, is associated with a marked increase in floaters that are be dark or red in color. Floaters associated with bleeding are described as lines or threads or spider webs or many dark dots. Depending on the size and degree of the vitreous bleeding, there may be an associated reduction in vision, so that patients also describe their vision as blurry or cloudy or hazy. If the vitreous gel hemorrhage is very significant, there could be a major loss of vision.

Whenever there has been a sudden onset of floaters or visual loss in a patient, a prompt, careful retinal examination is necessary both to diagnose the underlying cause of the vitreous bleeding and to determine if any specific therapy is required.

Important factors to evaluate at the time of the initial examination is whether or not there is a preexisting systemic disease, such as diabetes mellitus or sickle cell disease, that might have predisposed the patient to bleeding into the vitreous gel. Any significant ocular injury, whether penetrating or blunt, could also result in acute vitreous hemorrhage. It is important to know whether the patient has any previous history of eye disease, such as a previous retinal vein occlusion, that might have predisposed the eye to bleeding into the vitreous gel. It is important to determine the duration of the vitreous bleeding and whether or not previous episodes had ever occurred and cleared. We will want to know whether there are associated symptoms, such as flashing lights, that might be suggestive of an acute retinal tear or retinal detachment in addition to the vitreous bleeding.

A careful examination will be done promptly to determine the underlying cause of the vitreous bleeding. Measurement of visual function will be done initially. The degree of visual blur is dependent on the amount and location of blood within the vitreous gel. On occasion there is so much blood within the vitreous gel that the patient cannot see even hand motions. When visual acuity is

reduced to this degree, some determination of the visual field will be important to help to rule out an underlying retinal detachment. The structures in the front part of the eye will also be examined. Although rare, structural abnormalities in the front of the eye, such as an eroding lens implant, could result in bleeding into the posterior vitreous gel. The ophthalmologist, with the help of a indirect ophthalmoscope and using techniques such as scleral depression, can usually be certain that the retina at least has not detached even if the entire retina can not be adequately seen.

In cases where there is absolutely no view of the retinal structures, even with the bright instruments available, the ophthalmologist can utilize diagnostic ultrasonography equipment to study the interior of the eye. This instrumentation uses ultrasonic energy to create a picture of the structures within the eye. This technique will allow us to determine the degree and extent of retinal attachment and whether or not there is retinal detachment or any other abnormality in the eye such as intraocular tumor formation.

There are many possible causes for vitreous hemorrhage. The vitreous gel separates spontaneously from the posterior retina with age. In the vast majority of eyes, this separation results in an initial increase in floaters and some episodes of flashing lights. These symptoms gradually subside and there is usually no adverse effect on vision or retinal function. This change in the eye will occur at a younger age if the eye is highly myopic or if the eye has undergone previous cataract surgery. Certainly, ocular injury and any other longstanding ocular disease can result in premature separation of the vitreous gel. Whenever there is a significant hemorrhage associated with an acute posterior vitreous separation, this raises our concern regarding the possibility of an associated acute retinal tear. If a retinal tear does exist and it is not possible to detect this or treat it initially, this can then lead to a retinal detachment that ultimately would require surgery to repair. Therefore, other important causes of acute vitreous hemorrhage would include both a retinal tear and retinal detachment.

Other causes of vitreous hemorrhage include underlying diseases of the retinal blood vessels, including advanced diabetic retinopathy, a central retinal vein occlusion, or a branch retinal vein occlusion. Ocular injury, either penetrating or blunt can also result in immediate bleeding into the eye. The underlying cause here, of course, is evident from the history and timing associating the injury with the loss of vision. Rarely, age-related macular degeneration can result in significant intraocular bleeding. In the vast majority of patients with macular degeneration, bleeding only occurs within the retina, ultimately resulting in scarring and loss of central vision or macular function. Very rarely, extensive bleeding from the macula can rupture into the vitreous gel obscuring all vision and causing near total loss of visual function. This type of dense vitreous hemorrhage can be removed surgically to at least restore some degree of visual function in such eyes. There are other very rare causes of bleeding into the vitreous gel including those associated with acute subarachnoid hemorrhage, shaken baby syndrome and bleeding related to intraocular tumor formation.

If a patient is maintained on aspirin or anticoagulation therapy, including Coumadin or Heparin, if there is any underlying retinal disease that causes vitreous hemorrhage, it is likely that this bleeding will be enhanced by the presence of a systemic blood thinner. We do not, however, believe that such therapy by itself will cause bleeding into the eye.

With respect to treatment, the most important issue is the prompt evaluation of an eye with an acute vitreous hemorrhage to determine the cause and to determine the status and health of the retina. Even if the vision is blurred from blood in the vitreous for some length of time, if the retina behind the vitreous gel and blood is healthy and intact, ultimately vision can be restored either by spontaneous slow clearing of the vitreous gel or if this does not occur, by intervention with surgical techniques. Retinal surgeons have developed the technique of vitrectomy/retinal surgery over the past 25 years. This microsurgical technique permits retinal surgeons to introduce tiny instruments through the wall of the eye into the vitreous gel. The vitreous gel and blood clots can then be completely removed allowing us to treat any underlying retinal disease and restore visual function. In this way, the vast majority of patients with vitreous hemorrhage can be managed successfully using modern ophthalmology techniques.