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Macular Hole

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Macular Hole

In order to maintain the round structure of the eye, the central portion of the eye is filled with a jelly-like substance known as the vitreous. At birth and throughout a person's early years, the vitreous has a fairly solid structure; its consistency is somewhat between Jell-O and molasses. As a person ages, however, the vitreous jell begins to shrink. As the vitreous shrinks, it pulls away from the surface of the retina. In most cases, this pulling away or vitreous separation occurs without any negative effect on the eye. A patient may notice floaters as a result of this separation but no significant visual damage usually occurs.

What is a Macular Hole?

In some individuals, however, there may be an area where the vitreous remains firmly attached to the surface of the retina. As the shrinkage and forward movement of the vitreous progresses, traction or pulling is exerted on the retina, and eventually a small hole forms. If the hole occurs in the outer peripheral portion of the retina, a retinal tear or detachment may result. If, on the other hand, the vitreous is firmly attached to the central portion of the retina (the macula) then shrinkage and movement of the vitreous can result in the formation of a hole in this region. This hole is known as a Macular Hole. This process results in a defect or dark spot in the central vision and distortion and central vision loss results.

What are the symptoms of a Macular Hole?

The symptoms of a Macular Hole include decreased central vision at both distance and close. The symptoms also include distortion in central vision and a small defect in the central vision so that when a person reads, small letters may disappear. The diagnosis of a Macular Hole is made when an eye care specialist performs a retinal examination. This examination includes dilation of the pupil, and examination of the back of the eye. In some cases, special diagnostic studies may be necessary to confirm the diagnosis of a Macular Hole.

What is the treatment of a Macular Hole?

Until recently, very little could be done to correct the visual deficit of a Macular Hole. Now though, as a result of the introduction of microsurgical techniques, it is possible to perform a surgical procedure that may improve vision in many patients. This procedure is known as a "vitrectomy." The procedure removes the vitreous jelly located in the center of the eye and replaces it with clear saline.

In order to completely close the Macular Hole, additional pressure must be exerted on the center of the retina (the macula) to allow for complete sealing to take place. To assist in this process, a large gas bubble is placed in the eye. The bubble, when it comes into contact with the retina, presses the retina against the wall of the eye, sealing the Macular Hole.

In order to have its maximal effect, the air bubble must apply continued upward pressure against the central retinal surface. Because the macula is located in the back part of the eye, a patient's head must remain in a "face-down" position to allow the air bubble to rise toward the back of the eye and exert this pressure. Patients must maintain this face-down position for approximately 2-4 weeks after surgery in order to achieve successful closure of Macular Hole and to maximize the chances for visual improvement. This face-down positioning is the single most critical portion of the procedure for closing Macular Holes.

At the end of the period of strict face-down positioning, the patient can then resume a more normal upright posture. The gas bubble itself, however, may take anywhere from 6-8 weeks following surgery to completely disappear. The gas bubble is gradually reabsorbed by the body. The vitreous cavity then fills with clear, colorless liquid produced by cells in the front of the eye.

A vitrectomy is usually performed under local anesthesia and is done as an out-patient procedure. The patient must be seen for a postoperative visit the following day. Regular follow-up examinations are performed during the recovery period. Those examinations monitor for successful closure of the hole and they allow the surgeon to observe for any potential complications. These exams also help to reinforce the importance of face-down positioning for the patient. Patients are given several eye drops in the weeks following the surgical procedure to use in the operated eye.

Approximately 6-8 weeks after surgery, when the bubble has completely reabsorbed, the patient may need a change in glasses. Full visual recovery is gradual, and may not occur for up to three months after the surgical procedure has been performed. In some patients the visual acuity continues to improve for up to a year and a half.

As with all surgical procedures, there are potential complications or side effects. The surgical complications may include retinal tears or detachments that occur during the surgical procedure itself, or in the immediate postoperative period. Other complications that can occur include vitreous hemorrhaging in the eye. These problems occur infrequently and are usually repairable.

For patients who have not already undergone cataract surgery, the development of a cataract occurs in almost all individuals. This cataract can develop any time within a few months up to several years after the procedure. Surgical removal of the cataract and placement of an intraocular lens is then required.

Frequently Asked Questions

Is a Macular Hole the same as a macular degeneration?

No, macular holes and macular degeneration are two separate, distinct conditions. Macular degeneration is a condition that affects the tissues lying under the retina, while a Macular Hole involves damage from within the eye, at the junction between the vitreous and the retina itself. There is no relationship between the two diseases.

Are Macular Holes an inherited condition?

There is no known inheritance pattern for Macular Holes, and there is no evidence that they are carried from one generation to another.

If I have a Macular Hole in one eye, will it occur in the other eye?

Depending upon the degree of the attachment or traction between the vitreous and the retina, there may be a risk of developing a Macular Hole in the other eye. Your eye care specialist can determine the status of the vitreous jell and its degree of traction on the retinal surface in the uninvolved eye. In those cases where the vitreous has already become separated from the retinal surface, there is very little chance of developing a Macular Hole.

Is there anything that caused the Macular Hole, or is there anything that can be done to prevent a macular hole from developing in the other eye?

In very rare instances, trauma or other conditions lead to the development of a Macular Hole. In the vast majority of cases, however, macular holes develop spontaneously. As a result, there is no way to prevent their development.

Does it matter how long I have had the Macular Hole if I am interested in having surgery done?

There is evidence in the scientific literature that patients who have Macular Holes that have existed for less than six months have a better chance of recovering good visual recovery following surgery than those patients whose Macular Holes have existed for more than six months. Studies have shown that visual improvement can take place in patients with more long-standing Macular Holes after surgery, but rapid evaluation and treatment is still preferable in patients with Macular Holes. If a macular hole exists in one eye, it is very important for the patient to be monitored for any visual changes in the second eye.

If I have surgery, what type of visual improvements can be expected?

Typically, for Macular Holes that have existed for less than six months, a visual improvement of approximately “two lines” on the eye chart (or 50% improvement) can be achieved.

Obviously, this is an "average" visual improvement. Visual recovery varies from patient to patient, and each patient must be evaluated on an individual basis. Some patients achieve only a small amount of visual recovery, while others achieve a more significant amount.

How important is it really to maintain the face-down position?

Face-down positioning is felt to be crucial to the success of the operation. Therefore, before a vitrectomy is considered, a patient should experiment at home with maintaining a face-down position for a period of time to ensure that he or she is able to comply with the restricted activities necessary in the postoperative period. Some patients, because of medical conditions or physical limitations, may be unable to comply with the positioning.

For patients who are unable to position their head down for extended periods of time, there are three surgical options. One option is simply to perform the surgery in the normal manner and then not require the patient to assume the head-down positioning. For patients who have not had a cataract removed this will result in the formation of an immediate cataract. The second option is to perform the vitrectomy, instill a long-acting gas and at the same time perform cataract surgery with intraocular lens placement. The third option is to perform the regular surgery and then instill silicone oil in the eye. The advantage of silicone oil is that it does not require face-down positioning. However, it does have to be surgically removed surgically from the eye, usually two to three months following surgery.

Careful detailed studies are not available as to whether the procedures mentioned above will achieve as good a final result as using a long-acting gas and performing prolonged face-down positioning. However, all three procedures in selected patients have been successful. Clearly, one of these surgical options would be best used in patients who cannot assume the normal face-down positioning.

When will I get my vision back?

During the postoperative period, the air bubble in the eye will be pressing on the macula to ensure closure of the hole. As long as the air bubble is present in the eye, the eye is unable to focus light properly, and therefore vision is significantly disrupted. Often patients are only able to see shapes, shadows or hand movements in front of their eyes while the bubble is large. As the bubble begins to shrink, usually between the third and fourth week, vision begins to return. Good visual recovery is often not achieved for 6-12 weeks following the operation. At this point, after the bubble completely resolves and the macular hole heals, the patient often will need a new prescription for glasses. Patients who have not had cataract surgery, they may notice a gradual deterioration in vision months after the macular hole repair because a cataract has developed. Once the cataract surgery is performed, vision will usually return to its maximal level.

Am I able to travel after Macular Hole surgery?

Patients are not permitted to fly when there is a large air bubble present inside the eye. When a person rises n altitude, there are changes in air pressure that result in expansion of the air bubble and increased eye pressure. In order to prevent this recurrence, patients are restricted from any type of air travel until the bubble is nearly gone, or small enough that the patient's eye surgeon considers it safe to fly. The same restriction would apply to traveling to places with high altitudes, such as the mountains or certain parts of the country.

Are there any special chemicals or agents used to close the Macular Hole?

When surgery is performed to close a Macular Hole, no laser treatment is applied to the hole itself, because the laser can damage the delicate central tissue of the macula. The air bubble alone is used to help provide the seal between the retina and the wall of the eye. Experiments have been performed in recent years in an attempt to determine if chemicals or biological agents applied to the surface of the macular hole at the time of surgery will increase the success rate for the operation. To date, the studies have shown that these chemicals or biologic agents do not improve the success of this procedure.