

Macular Degeneration

Why Is the Macula Important?

Unlike a photograph in which the entire picture is in focus, our eyes can only focus on the object at which we are looking directly. (Try reading the first word of this sentence while staring at the period at the end of the sentence).

The macula is responsible for our clear central vision. The remainder of the retina is used for side or peripheral vision. Damage to the macula causes blurring of our central vision which may make it difficult to read, drive, watch television, and recognize familiar faces.

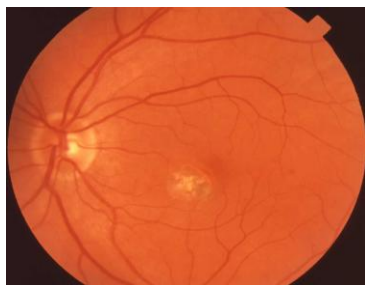
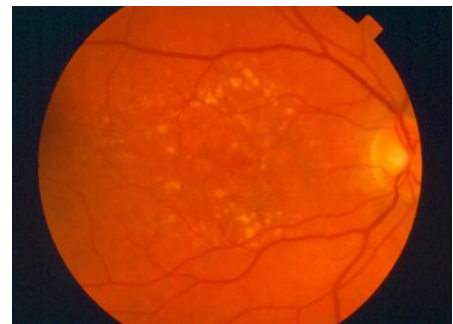
What is Age-Related Macular Degeneration?

Macular degeneration is the leading cause of poor vision in the United States. Each year, approximately 170,000 new cases of age-related macular degeneration (AMD) are discovered. Macular degeneration occurs whenever a previously normal macula begins to deteriorate. Juvenile macular degeneration begins at a young age and is quite rare. AMD is very common and occurs in older people, although getting older does not always result in visual problems.

As AMD progresses, the central vision begins to blur, but the peripheral vision remains normal. Please remember that macular degeneration does not cause total blindness. Even at its worst, AMD spares peripheral vision and allows patients to care for themselves. Macular degeneration often affects both eyes, although the second eye may not become involved for many years.

There are two main types of AMD, dry macular degeneration and wet macular degeneration.

Ninety percent of macular degeneration patients have the dry form. The cells in the macula slowly wear out. The loss of central vision is often mild. Some patients may have progressive deterioration, usually over a long period of time, resulting in severe loss of central vision. Only 10 percent of



severe loss of central vision is due to dry AMD.

The more severe wet (exudative form) affects 10 percent of macular degeneration patients. In this type, fluid may collect or abnormal blood vessels may grow underneath the retina. They often cause severe damage to the vision from bleeding and scarring under the macula. The wet form accounts for 90 percent of the patients with severe loss of central vision.

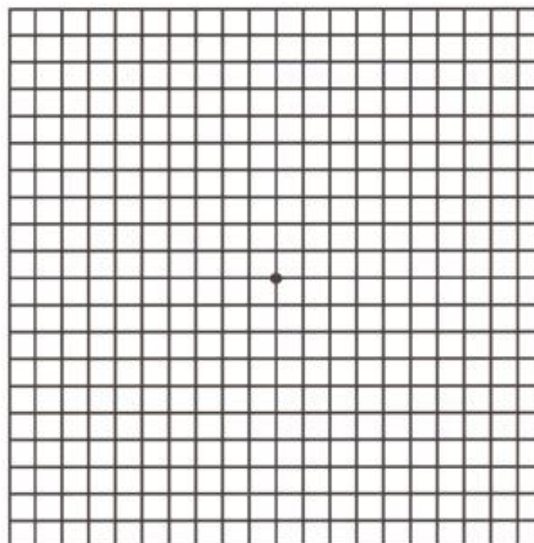
What Causes Age-Related Macular Degeneration?

Aside from aging, no specific cause of macular degeneration has been identified. Heredity plays a role in many patients. The disorder is limited to the eye and is not associated with problems elsewhere in the body. Tumors and infections are not associated with macular degeneration. Extensive use of the eyes, reading or watching television does not cause macular degeneration or result in further damage. There is nothing a person can do that will accelerate or retard the progress of AMD.

How Do I Know if I Have Macular Degeneration?

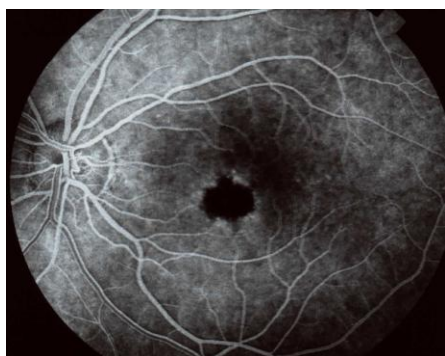
Most people with macular degeneration have either blurred or distorted vision in one or both eyes. Distorted or wavy vision is a very important symptom and should be reported promptly to your doctor. This is especially true when straight lines (doorways, telephone poles, etc.) appear wavy. Many people with visual loss in one eye may not realize they have a problem because the good eye takes over for both eyes.

You will be given a special Amsler grid test to be used at home to help you recognize early changes in your vision or identify new areas of distortion. This grid test should be used on a daily basis. It is very important to check each eye separately. There is a sample grid at the end of this booklet with instructions for its use.



What Tests Can I Expect?

The doctor will examine your eyes on each visit. If necessary, he may order a fluorescein angiogram. In this test, a dye is injected into an arm vein, and pictures are taken of the macula as the dye circulates through the blood vessels. In some cases, another type of angiogram, called High Speed-ICG, is used to take a movie of the deepest layers of the eye using a different dye and a special infrared camera.



Because the vessels of the eye can be photographed directly, no X-rays are involved and the tests are safe for patients who are allergic to X-ray dyes. Patients allergic to Iodine should only have High Speed-ICG with special precautions. The angiogram provides a detailed picture of the retinal blood vessels and will detect any abnormal vessels that might be present. The doctor uses this information to determine whether treatment might be helpful. The dye is excreted in your urine for up to 24 hours following the injection. The

whites of your eyes and your skin might turn slightly yellow for a day. Hospitalization is not required for this test, and you are free to go home when it is finished.

Another very common test is Optical Coherence Tomography, or OCT. This is a simple and painless snapshot that takes extremely detailed images of the macula.

What Treatment Is Available for Macular Degeneration?

There are no eye drops or operating room surgeries that have been shown to be effective in curing macular degeneration. The current standard of care for "wet" macular degeneration is clearly treatment with Vascular Endothelial Growth Factor (VEGF) inhibitors, particularly Avastin, which is preferred by a significant majority of retinal doctors around the world. Conventional laser treatment only benefits a small percentage of macular degeneration patients who have certain types of the wet form. However, laser can stabilize vision and prevent further deterioration and in some cases, improve vision to some degree.

Conventional Laser Treatment

Conventional laser consists of a strong beam of light, which enables the physician to seal (cauterize) the abnormal blood vessels, which may grow in the wet form of macular degeneration. Before the laser procedure, an anesthetic injection may be used. The injection often causes the vision in the treated eye to be blurred for several hours. You will be in a sitting position for the treatment.

The actual laser treatment, which is not painful, usually takes less than 5 minutes. You will be able to return home immediately and resume your normal activities within 24 hours.

Unfortunately, only some types of wet AMD respond to conventional laser. Laser treatment does not cure macular degeneration, and it does not necessarily prevent abnormal blood vessels from returning in the future. It is important for you to continue to test your vision with the Amsler grid chart. If further changes are noted, they should be reported promptly to your doctor. If the abnormal blood vessels do return, it may be possible to treat them with laser again.

Outmoded Laser Techniques

Abnormal new blood vessels may grow into the very center of the macula in some cases of macular degeneration. These vessels may grow in a variety of patterns. Depending on the pattern of leakage, one previous technique was photodynamic therapy. This involves injection of a medicine called Visudyne, which is selectively absorbed by abnormal, growing blood vessels. The medicine is allowed to adsorb for 15 minutes after beginning infusion through an intravenous line. Red laser light is then shown into the eye, which activates the medicine. This chemically cauterizes the abnormal blood vessels as well as the surrounding normal tissue. This results in visual improvement in only about 15 to 20 percent of cases, but prevents further vision loss in another 50 to 60 percent. A significant percentage of patients are actually made worse by the procedure, and it is very difficult to predict who may be harmed.

In some cases, transpupillary thermal therapy, another older treatment technique has been used. Instead of applying a hot laser, which burns the tissue that it touches, transpupillary thermal therapy involves gently heating this area with much cooler laser settings. This results in very mild photocoagulation of the abnormal tissue, with less damage to surrounding normal tissue. This has been shown to stabilize or improve vision in 50 to 70 percent of patients with this pattern of leakage.

All of these treatments seek to treat the area of leakage directly. These leaky blood vessels grow in a pattern like a small flat tree or bush underneath the retina. In some cases, it would be just as effective to treat the underlying trunk blood vessel, which feeds this tree. In the past, available cameras have not been able to visualize the feeder vessel. Using a more advanced camera we can, in many cases, visualize this feeder vessel. Feeder vessel therapy has been shown to be useful in some cases not treatable by other means.

Vascular Endothelial Growth Factor (VEGF) Inhibitors

Avastin- Although all of these laser techniques are of historical interest, they are no longer widely used, if used at all. The current stand of care is clearly treatment with Vascular Endothelial Growth Factor Inhibitors. Avastin is an FDA approved medication that inhibits the growth of new blood vessels. It was originally approved for the treatment of colorectal cancer, but it has been shown to be effective with macular degeneration as well. The data on Avastin shows that it is clearly and vastly superior to Macugen or most other treatments, resulting in actual visual improvement in many patients far more often than other treatments. It is an antibody which inhibits abnormal vessel growth by binding and inhibiting a substance called Vascular Endothelial Growth Factor, or "VEGF". This substance is abnormally present in eyes with certain conditions that cause abnormal vessels to grow and bleed within the eye. Avastin, when injected into the eye, can inhibit this process and reduce leakage and bleeding, hopefully stabilizing or even improving vision. Prior to injection, the eye is sterilized and anesthetized, and the injection is general very safe and not unpleasant for the patient. The major risks, each individually rare, are infection, bleeding, cataract, or retinal detachment. For this reason, we watch the eye very closely after injection and recheck the eye, generally within 1 to 2 weeks after injection. There is a report of higher risk of blood clots leading to problems such as heart attack or stroke after using IV Avastin in cancer patients in high doses (up to 1500 mg. IV) combined with 5-Fluorouracil, another cancer drug, intravenously every 2 weeks. This was only found in colon cancer patients. By comparison, we use 1 to 2.5 mg. injected into the isolated space of the eye every 2 or 3 months. Genentech, the company that makes Avastin, advised at the time of that report not to apply this precaution to clinical situations other than colon cancer patients receiving this high dose Avastin in combination with 5-Fluorouracil. We are none-the-less mindful about this and only recommend Avastin when we believe the benefits clearly outweigh the risks. When used alone, Avastin intraocular injections have been found to have a very high safety profile. Avastin injection may need to be repeated every 1 to 3 months for several injections. With concurrent use of various laser techniques, it may not be necessary to repeat injections as often. There is some evidence that giving a dose every month for three doses and then cutting back to reinjection only as needed may have a better visual result in some people. We will watch your progress very carefully during this type of therapy and discuss your individual circumstances with you.

Lucentis- Another drug, Lucentis, is actually a slightly altered fragment of Avastin, which has fewer active sites. It may work as well as Avastin, but many doctors do not believe it works for as long. It is thousands of dollars more expensive and can result in considerable cost to the patient. There is considerable controversy surrounding Lucentis and why it was really developed in the first place. Because of this and the likely therapeutic superiority of Avastin, we recommend Avastin in most cases where an injection is recommended.

Macugen was the first FDA approved medication that inhibits the growth of new blood vessels, and at this time is really only of historical interest. In practical experience, Macugen rarely improves vision. Vision loss is often slowed, but, as with Photodynamic Therapy, most patients do continue to lose vision. There are no compelling medical reasons to use Macugen or to switch from Avastin to Macugen in ongoing therapy.

Systemic Medications

No systemic medications have been proven to be effective for macular degeneration, except for intravenous Avastin, which is safer and more effective given as an intraocular injection. Some research, however, suggests that certain dietary supplements may help. Vitamins and minerals such as zinc, vitamin E and selenium are advocated by some researchers for the purpose of trying to prevent further visual loss from dry macular degeneration. Other substances that have received much attention include Bilberry and Lutein. Current studies may determine whether these medications are really helpful. Your doctor will discuss them with you if he or she feels they might be appropriate for you.

Dietary Measures

In addition to the vitamins listed above, some people do believe that certain foods, which contain these vitamins, or other factors may help control the progression of macular degeneration. Such foods include dark green leafy vegetables, red wine (particularly the Cabernet, Pinot Noir, and Syrah grapes) and other foods rich in antioxidant vitamins.

Surgery

Very few patients with AMD will need surgery. Surgery may be considered when abnormal new vessels grow in the center of the macula or when a very large hemorrhage occurs. These are instances in which the eye is threatened with severe visual loss. Your doctor will discuss this further if it is appropriate.

New Research

There are many new research studies under way to look for other treatments for specific types of macular degeneration. We will keep you posted on new developments as news becomes available. Unfortunately, in recent years there has been a growing practice of disguising marketing efforts as "research", where doctors are paid by drug companies to recruit patients for

exercises to expand markets for the most expensive drugs regardless of whether this is in the patient's best interest. We have been active on a national level advocating for patients' rights, and particularly to illuminate relationships with industry where doctors have a financial interest in using patients in this way. We work very hard to separate real research from such practices, and we will try to keep you informed about legitimate new findings.

Low Vision Aids

For those patients with AMD who lose central vision, low vision aids may help to maintain the ability to do everyday tasks. These aids range from spectacle and hand-held magnifying glasses to special lighting devices. Telescopic clip-on lenses to fit over your present glasses are sometimes used to improve distance vision. Special television systems may help restore slow reading ability



to those patients who have severe loss of central vision. Low vision aids are prescribed by specialists who will be recommended by your doctor if appropriate. The Sight Center of Toledo provides these services and works very closely with Vision Associates, seeing patients at the Vision Associates offices every Tuesday.



In addition, the New York Times prints a weekly newspaper in large print for those with limited vision. (The New York Times Large Type Weekly, P.O. Box 2570, Boulder, Colorado 80303); Reader's Digest also publishes in large print. (Reader's Digest Association, Pleasantville, New York 10571); Large print books are published by G.K. Hall, (70

Lincoln Street, Boston, Massachusetts,

1-800-343-2806) and are available at most

book stores.

It is encouraging to know macular degeneration does not lead to total blindness, but only to the loss of the central portion of the vision. Side vision is retained in all cases. Low vision aids, rarely restore normal reading vision, but may offer significant help. [Click Here](#) for information in a simple overview lecture.

What to do if you have Macular Degeneration

- Have a regular eye examination at least once yearly. If you are seeing a retinal specialist as well as your general eye doctor, you may be able to alternate visits to maximize convenience and reduce cost.
- Use an Amsler grid at home to monitor your vision. Look at the chart from reading distance using any bifocals or reading glasses you normally use. All you have to do is take a quick glance. If you stare at it for too long, the image will fluctuate and become confusing.

- Quit smoking and control your blood pressure at well as you can. Both of these measures may help.
- At least consider using antioxidant vitamin supplements. There is some evidence that these may help stabilize the wear and tear process. There are three reasonable options:
- Use a multivitamin such as Centrum Silver or an equivalent,
- Use an “eye vitamin” such as Ocuville or I-caps. As a rule of thumb, you should not have to spend more than about \$15.00 a month on this. If you are spending more, you may be using something that is less proven or be a victim of a marketing scam.
- Go “ala carte” using single preparations including Vitamin A, D, E, C, B complex, zinc, and selenium. Other supplements that may help include Lutein, zeaxanthine, Bilberry, and Ginkgo biloba. If you are a smoker, you should avoid Vitamin A, as this may increase the risk of lung cancer. You may use Lutein, which is a similar "carotene" molecule.
- The most convenient choice is to use an eye vitamin, which contains Lutein either with or without a multivitamin. It is also reasonable for your younger family members to consider using these, since the disease has a hereditary component, and the vitamins may have a preventative effect.
- Eat well and consider including food types that are suggested to have beneficial effects. These would include dark, green leafy vegetables such as spinach, other sources of the vitamins listed above, and red wine (especially from the Cabernet and Syrah grapes).

Call if you have any disturbance in your vision. You can reach us 24 hour a day at

419-578-2020 or toll free at

1-888-322-7070 .