

Age-Related Macular Degeneration (AMD) – An Overview

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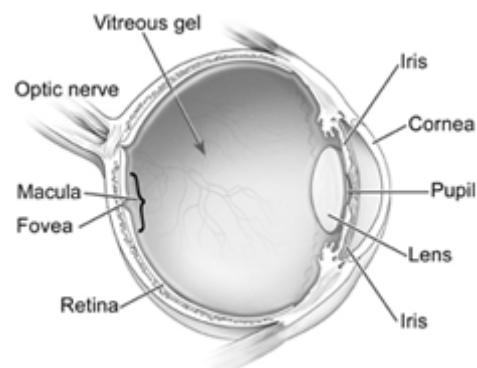
What is age-related macular degeneration?

Age-related macular degeneration (AMD), as its name suggests, is a disease associated with getting older. AMD affects the part of the eye called the macula.

In some cases, AMD advances so slowly that people do not have significant problems with their vision. In other situations, people may notice blurriness. **When one is diagnosed with AMD, it does not automatically mean that one is “going blind.”** However, AMD is a serious problem for many people; statistically speaking, it is a leading cause of vision loss in older Americans.

Where is the macula?

The macula is located in the center of the **retina**, the light-sensitive tissue at the back of the eye. The retina converts light, or an image, into electrical impulses. The retina then sends these impulses, or nerve signals, to the brain.



AMD occurs in two forms: wet and dry.

What is wet AMD?

Wet AMD occurs when abnormal blood vessels behind the retina start to grow under the macula. These new blood vessels tend to be very fragile and often leak blood and fluid. The blood and fluid raise the macula from its normal place at the back of the eye. Damage to the macula occurs rapidly.

With wet AMD, loss of central vision can occur quickly. An early symptom of wet AMD is that straight lines appear wavy.

What is dry AMD?

Dry AMD occurs when the light-sensitive cells in the macula slowly break down, gradually blurring central vision in the affected eye. The most common symptom of dry AMD is slightly blurred vision. You may have difficulty recognizing faces. You may need more light for reading and other tasks. Dry AMD generally affects both eyes, but vision can be lost in one eye while the other eye seems unaffected. Scientists are still not sure what causes dry AMD.

What are drusen?

One of the most common early signs of dry AMD is **drusen**. Drusen are yellow deposits under the retina. They often are found in people over age 60. Your ophthalmologist can detect drusen during a comprehensive dilated eye exam. An increase in the size or number of drusen raises a person's risk of developing either advanced dry AMD or wet AMD.

Dry AMD has three stages:

- **Early AMD.** People with early AMD have either several small drusen or a few medium-sized drusen. At this stage, there are no symptoms and no vision loss. **Fortunately, people with early AMD have a very low chance of significant vision loss.** Regardless, it is important for them to have occasional eye examinations to look for early signs of problems.
- **Intermediate AMD.** People with intermediate AMD have either many medium-sized drusen or one or more large drusen. Some people see a blurred spot in the center of their vision. More light may be needed for reading and other tasks.
- **Advanced Dry AMD.** In addition to drusen, people with advanced dry AMD have a breakdown of light-sensitive cells and supporting tissue in the central retinal area. This breakdown can cause a blurred spot in the center of your vision. Over time, the blurred spot may get bigger and darker, taking more of your central vision. You may have difficulty reading or recognizing faces until they are very close to you.



Normal vision



The same scene as viewed by a person with advanced age-related macular degeneration

Frequently Asked Questions about AMD

Which is more common - the dry form or the wet form?

The dry form is much more common. However, if only advanced AMD is considered, about two-thirds of patients have the wet form. Because almost all vision loss comes from advanced AMD, the wet form leads to significantly more vision loss than the dry form.

Can the dry form turn into the wet form?

Yes. All people who have the wet form had the dry form first. The dry form can advance and cause vision loss without turning into the wet form. The dry form also can suddenly turn into the wet form, even during early stage AMD. There is no way to tell if or when the dry form will turn into the wet form.

Can advanced AMD be either the dry form or the wet form?

Yes. Both the wet form and the advanced dry form are considered “advanced AMD.” Vision loss occurs with either form. In most cases, only advanced AMD can cause vision loss. People who have advanced AMD in one eye are at especially high risk of developing advanced AMD in the other eye.

Who is at risk for AMD?

The greatest risk factor is age. Although AMD may occur during middle age, studies show that people over age 60 are clearly at greater risk than other age groups. For instance, a large study found that people in middle-age have about a 2 percent risk of getting AMD, but this risk increased to nearly 30 percent in those over age 75.

Other risk factors include:

- **Smoking.** Smoking may increase the risk of AMD.
- **Obesity.** Research studies suggest a link between obesity and the progression of early and intermediate stage AMD to advanced AMD.
- **Race.** Whites are more likely to lose vision from AMD than African Americans.
- **Family history.** Those with immediate family members who have AMD are at a higher risk of developing the disease.
- **Gender.** Women appear to be at greater risk than men.

Can my lifestyle make a difference?

Yes. Your lifestyle can play a role in reducing your risk of developing AMD.

- Eat a healthy diet high in green leafy vegetables and fish.
- Don't smoke.
- Maintain normal blood pressure.
- Watch your weight and exercise.

What are the symptoms of AMD?

Both dry and wet AMD cause no pain.

For dry AMD: Many people with dry AMD do not have symptoms. For those who begin to have symptoms, people may notice mild, blurred vision. As fewer cells in the macula are able to function, people will see details less clearly in front of them, such as faces or words in a book. Often this blurred vision will go away in brighter light. If the loss of these light-sensing cells becomes great, people may see a small--but growing--blind spot in the middle of their field of vision.

For wet AMD: the classic early symptom is that straight lines appear crooked. This results when fluid from the leaking blood vessels gathers and lifts the macula, distorting vision. A small blind spot may also appear in wet AMD, resulting in loss of one's central vision. AMD rarely affects one's peripheral, or side, vision.

How are problems from AMD detected?

Breakthroughs in modern technology allow early detection and, if necessary, early treatment of problems from AMD. The earlier a problem is diagnosed, the better one's chance of having good vision.

Your ophthalmologist will use eye drops to dilate, or enlarge, your pupils. Dilating the pupils allows your ophthalmologist to view the back of the eye better.

Commonly, a noninvasive machine called **Optical Coherence Tomography (OCT)** will take high-definition, digital pictures of the retina. This helps look for microscopic changes in the eye. Essentially, it acts as an early warning system for problems. The latest OCT imaging devices can, in just a few seconds, scan your macula over 100 times at a resolution of 2 to 25 microns (a micron is 0.000001 meters). This is a breakthrough technology which gives a much "higher definition" picture than ever possible before.

If your ophthalmologist is concerned about wet AMD, he or she may suggest a **fluorescein angiogram**. In this test, a special dye is injected into your arm. Pictures are taken as the dye passes through the blood vessels in your retina. This important test is essential to identify leaking blood vessels and to detect wet AMD. The fluorescein angiogram is the gold standard in detecting wet AMD. The dye used is non-toxic and is typically well-tolerated.

How is wet AMD treated?

Recent advances in treatment make it a very hopeful time for people with wet AMD. Modern treatments (which did not even exist 10 years ago) have been shown to stabilize one's vision (in most cases) and even improve sight. Wet AMD can be treated with laser surgery, photodynamic therapy, and injections into the eye. None of these treatments is a cure for wet AMD.

Laser surgery. This procedure uses a laser to destroy the fragile, leaky blood vessels. Only a small percentage of people with wet AMD can be treated this way.

Photodynamic therapy. A drug called verteporfin is injected into your arm. It travels throughout the body, including the new blood vessels in your eye. The drug tends to "stick" to the surface of new blood vessels. Next, a light is shined into your eye for about 90 seconds. The light activates the drug. The activated drug destroys the new blood vessels and leads to a slower rate of vision decline. Treatment results are often temporary and may need to be repeated.

Injections. This is the most common way to treat wet AMD. A type of medication called anti-VEGF therapy is injected directly into the eye. Such drugs include **Lucentis, Eylea, and Avastin**. In eyes with wet AMD, there are abnormally high levels of a specific growth factor called "VEGF" (which stands for Vascular Endothelial Growth Factor).

VEGF promotes the growth of abnormal new blood vessels. Anti-VEGF therapy block the effects of this growth factor.

This treatment requires multiple injections that may be given as often as monthly. The eye is numbed before each injection, so it does not hurt. This drug treatment can help slow down vision loss from AMD and, in some cases, improve sight. **Lucentis, Eylea, and Avastin are today's main weapons against fighting blindness from AMD.**

How is dry AMD treated?

Treatment is based on the old saying:

An ounce of prevention is worth a pound of cure.

For dry AMD, the focus is on preventive medicine. In a large clinical study sponsored by the National Eye Institute, a specific combination of antioxidant vitamins have been shown to reduce the risk of vision loss from AMD by 25%. This vitamin combination is called the "AREDS" formula, based on the name of the study (Age-Related Eye Disease Study). In a follow-up study, another vitamin combination, "AREDS2" formula, worked equally well; this formula replaced beta carotene with omega-3 fatty acids, lutein, and zeaxanthin. Both vitamin formulas can be purchased over-the-counter at your local pharmacy.

These vitamins are not a cure for AMD. It will not restore vision already lost from the disease. However, it may delay the onset of advanced AMD. It may help people who are at high risk for developing advanced AMD keep their vision.

For more information regarding vitamin supplements, see:

<http://www.nei.nih.gov/amd/>

How can I take care of my vision now that I have AMD?

If you have dry AMD, you should have a comprehensive dilated eye exam periodically. This is typically done every 4-6 months. Your ophthalmologist can monitor your condition and check for other eye diseases. Also, your doctor may suggest that you take the AREDS or AREDS2 formulation of vitamins.

Because dry AMD can turn into wet AMD at any time, if you notice any blurriness or changes with your vision, schedule an eye exam immediately. Worrisome changes include noticing that straight lines are "wavy."

This handout was created by Jerry W. Tsong, MD. After graduating from MIT and Harvard Medical School, Dr. Tsong completed residency at the George Washington University Medical Center and fellowship at Doheny Eye Institute. Dr. Tsong is the Medical Retina Specialist at Greenwich Ophthalmology Associates. For more information about him, please visit www.greenwicheyecare.com.

Information in this handout was adapted from "Facts about Age-Related Macular Degeneration" accessed on 6/23/09. http://www.nei.nih.gov/health/maculardegen/armd_facts.asp