Treatments for Macular Degeneration

Dry Age-Related Macular Degeneration

AREDS2 supplement formula

People with intermediate-stage dry age-related macular degeneration (AMD) may benefit from taking a special mix of supplements to decrease their risk of losing central vision. AREDS2 also may slow development of wet age-related macular degeneration, the less common form of the disease. This supplement does not reverse existing vision damage.

How it works: Antioxidants help to dampen inflammation, which is a key feature of dry AMD. Zinc has multiple roles in the body in immunity, and copper aids in balancing potential negative effects of zinc.

Delivery method: A gel capsule taken by mouth. The AREDS2 recommendation for the supplement formula now includes:

- 500 milligrams of vitamin C
- 400 international units of vitamin E
- 10 milligrams of lutein
- 2 milligrams of zeaxanthin
- 80 milligrams of zinc as zinc oxide
- 2 milligrams of copper as cupric oxide

Medications

Two FDA-approved treatments for dry age-related macular degeneration are intended for people in a late stage of the disease who have been diagnosed with geographic atrophy.

Syfovre® (pegcetacoplan injection)

How it works: This drug slows progression of geographic atrophy by inhibiting inflammatory processes in the part of the eye that is damaged in age-related macular degeneration. In clinical trials, it reduced growth of atrophied regions of the retina by up to 36%, slowing vision loss.

Delivery method: Eye injections every 25 to 60 days.

Side effects: Eye discomfort, floaters (spots in the eye's field of vision), and rupture of small vessels of the eye; more rarely, wet AMD, eye infection, and retinal detachment.

■ **Izervay®** (avacincaptad pegol injection)

How it works: Izervay slows progression of advanced and severe geographic atrophy. It works by targeting excessive activation of the complement system, which is the immune system's early response to harmful pathogens and contributes to the development of geographic atrophy.

Delivery method: Monthly eye injections for up to a year.

Side effects: Temporarily increased fluid pressure in the eye, blurred vision, and broken blood vessels in the eye; more rarely, wet AMD, eye infection, and retinal detachment.

Wet Age-Related Macular Degeneration

Wet age-related macular degeneration is most commonly treated with injections of angiogenesis inhibitors into the eye, photodynamic therapy, or laser surgery, which all slow the growth of new, fragile, and often leaky blood vessels. This may slow the rate of vision decline or stop further vision loss.

Anti-VEGF and Other Injected Treatments

Anti-VEGF shots block vascular endothelial growth factor (VEGF), a key molecule in the production of new blood vessels in a process called angiogenesis.

■ **Avastin®** (bevacizumab injection)

How it works: This drug is used off-label for age-related macular degeneration with similar anti-angiogenic effects as Lucentis, an approved drug based on Avastin and developed by the same manufacturer, Genentech. While Avastin was designed to inhibit blood vessel growth associated with various cancers, it has been found (though not proven in a clinical trial) to inhibit blood vessel growth that causes age-related macular degeneration.

Delivery method: Monthly injection into the eye.

Side effects: Side effects are likely very similar to those of Lucentis (see below), including eye irritation, high blood pressure, and eye pain.

■ **Lucentis®** (ranibizumab injection)

How it works: Lucentis binds to and slows the activity of VEGF, which in turn blocks the production of new growth of fragile blood vessels in damaged areas of the eye. VEGF is continually produced in age-related macular degeneration, and routine administration of Lucentis over time is required.

Delivery method: Monthly injection into the eye.

Side effects: Floaters (spots in the eye's field of vision), rupture of small vessels of the eye, eye pain, and, more rarely, inflammation of the interior of the eye, retinal detachment, retinal tear, increased eye pressure, cataract, and blood clots.

Note: Lucentis was developed from Avastin, described above. In head-to-head comparisons of the two in clinical trials, they showed similar benefits for age-related macular degeneration, largely with comparable safety outcomes.
Manufacturer's prescription assistance program: 1-866-422-2377

■ **Eylea®** (aflibercept injection, also known as VEGF Trap-Eye)
How it works: Eylea is a protein engineered to block both VEGF and another molecule called placental growth factor. Both proteins promote abnormal blood vessel growth.
Delivery method: Injected into the eye, initially every month and then every two months. The most recently approved Eylea HD (8mg as opposed to the 2mg standard formulation) may make it possible to extend the time between injections to once every four months.
Side effects: Floaters, rupture of small vessels of the eye, eye pain, increased cataract risk, increased fluid pressure in the eye, and more rarely with the original dose, inflammation of the interior of the eye and retinal detachment (which are possible with this type of eye injection generally).
Manufacturer's prescription assistance program: 1-855-395-3248

■ **Beovu®** (brolucizumab-dbll injection)
How it works: Binds to and inhibits the activity of VEGF, which blocks production of new growth of fragile blood vessels in damaged areas of the eye.
Delivery method: Three monthly injections followed by injections every 2-3 months.
Side effects: Floaters, rupture of small vessels of the eye, eye pain, blurred vision, and cataract; more rarely retinal detachment, serious eye inflammation, increased clotting risk, increased fluid pressure in the eye.
Manufacturer's prescription assistance program: 1-800-277-2254

■ **Vabysmo®** (faricimab-svoa injection)
How it works: This drug inhibits VEGF and another angiogenic molecule called angiopoietin-2, limiting growth of new blood vessels.
Delivery method: Injection into the eye monthly for 4 months, followed by follow-up imaging to determine best choice among possible dosing regimens, ranging from every 2-4 months.
Side effects: Floaters, rupture of small vessels of the eye, eye pain, blurred vision, and cataract; more rarely retinal detachment, serious eye inflammation, increased clotting risk, increased fluid pressure in the eye.

Photodynamic Therapy with Visudyne® (verteporfin for injection)

How it works: During the photodynamic therapy (PDT) procedure, Visudyne is injected into the arm. The drug is absorbed by the fragile, leaking blood vessels in the eye. Because Visudyne is activated by light, the doctor directs a low-intensity laser at the retina for a little over a minute. The light activates the Visudyne, allowing it to destroy the abnormal vessels without harming healthy blood vessels. PDT may help to stabilize vision, but it will not restore lost vision.

Side effects: Headache, injection site reaction, and blurred or reduced vision. Because the drug is activated by light, it is important to avoid exposing the eyes or any part of the skin to sunlight or bright indoor light for five days after treatment.

Note: This treatment has seen a decline in usage since the introduction of anti-VEGF therapies.

Laser Surgery

Effective for: Laser photocoagulation surgery was the first treatment used for wet age-related macular degeneration, but it is appropriate only for a small subset of people. This treatment is not as commonly used as angiogenesis inhibitors.

Delivery method: During an outpatient procedure, the eye is numbed, and a high-energy laser heats, seals, and destroys abnormal leaky blood vessels that threaten damage to the eye. When successful, laser surgery is a one-time treatment, but if new blood vessels grow, surgery may need to be repeated.

Side effects: Mild pain during and/or shortly after the procedure is possible and usually relieved by taking nonprescription pain medication. Reduced vision and scarring of the retina are possible.