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MACULAR DEGENERATION

Macular degeneration is the most common cause of visual loss in the U.S. in patients over 55 years of age. Although it rarely causes total blindness, it may produce serious loss of central vision.

This page will provide a basic understanding of what causes macular degeneration, how it affects eyesight, and what treatment is available.

What is the macula?
The retina is the nerve tissue that lines the back wall of the eye. Much like the film in a camera, the retina is sensitive to light. It transforms light energy to nerve stimuli, and "sends a picture" through the optic nerve to the brain. The macula is a specialized are in the central part of the retina. Because of the abundance of nerve connections that serve the macula, it is the part of the retina that provides for sharp, clear color vision. Our ability to read and to see fine detail depends upon the health of the macula.

Unfortunately, the macula is prone to degenerative changes that affect the rest of the retina less frequently. There are unusual types of macular degeneration that start early in life. However, most patients begin to notice visual symptoms after age 50.

What are some symptoms of macular disease?
An object that normally appears straight, such as a telephone pole, may seem bent or crooked. A dark gray spot may appear in central vision. The size of an object may appear different to each eye. Colors may not look the same to each eye. Any of these changes should be reported to your physician and followed up with a thorough retinal exam.

What changes are seen in the eye?
The earliest sign of macular degeneration is the formation of yellow deposits under the retina. These deposits, called drusen, may cause the overlying retina to become slightly distorted. This may result in mild distortion of vision. However, drusen do not produce any severe

loss of vision. This type of macular degeneration is referred to as the “dry” type and requires no treatment. It may cause a slowly progressive loss of vision, but visual loss is usually mild. Eyesight may be helped somewhat with the use of special low vision lenses, magnifying lenses for close-up and telescopic lenses for distance. Your physician will refer you to an expert in this field if he feels these aids would be beneficial to you. Approximately 7% of patients with drusen progress to the more serious form of macular degeneration, often referred to as the “wet” type. In this stage, abnormal blood vessels grow under the retina. These vessels, called subretinal neovascularization, are thin-walled and fragile and tend to leak fluid and blood into the retina. Untreated, this leakage causes scar tissue to develop which, in turn, results in loss of central vision. Macular degeneration does not cause complete blindness since peripheral (side) vision is not affected. It does, however, impair the ability to read. Early detection of abnormal blood vessels increases the chance of saving central vision.

DIAGNOSIS

In patients with macular degeneration, it is important to determine if any abnormal blood vessels are present and if so, their location. Two photographic tests can be used to detect these vessels and determine appropriate treatment: Fluorescein and Indocyanine Green Angiography. With both tests, a dye is injected into a vein in the arm. The dye quickly passes through the circulation to the eye and serial photographs reveal any leaking blood vessels. These tests do not involve X-rays and are quite safe. The doctor may recommend either or both tests. Rarely, patients may become nauseated or have allergic reactions to the dye. Patients with a known Iodine (i.e. shellfish) allergy should report this to the physician before ICG testing. These patients will be premedicated to eliminate the risk of a severe allergic reaction.

TREATMENT

If abnormal blood vessels are present, progressive visual loss occurs in approximately 2/3 of patients. Various types of lasers can be used to treat the abnormal blood vessels and reduce the severity of the visual loss.

Standard laser treatment is an intense beam of light which seals the abnormal blood vessels. The body can then reabsorb the fluid and blood that has accumulated. This type of laser will cause a scar and leave a permanent blind spot. As such, it is not used, if abnormal vessels are beneath the center of the retina.

Photodynamic therapy or PDT involves injecting a photosensitive dye into an arm vein and a low dose laser to activate the dye within the abnormal retinal blood vessels. The activated dye causes closure of the abnormal blood vessels. Most patients require repeated treatments at three month intervals with the average patient requiring 4 to 5 sessions. In some cases, injection of an anti-inflammatory medicine (**intravitreal Kenalog**) may be used to augment the laser treatment.

Transpupillary thermotherapy or TTT is a 3rd type of laser which slowly heats the abnormal blood vessels to reduce their tendency to bleed. Unlike standard laser treatment, the lower dose TTT laser delivers heat to the area of abnormal blood vessels without causing a permanent blind spot.

The type of laser used will be determined by the type, size and location of the abnormal blood vessels. Some patients may require more than one treatment. The goal of treatment is to stabilize vision. Your physician will discuss the various options with you and suggest the most appropriate treatment for your situation.

There are three **experimental medicines** presently being evaluated for the treatment of abnormal vessels in patients with ARMD. Two of these medicines, Macugen and RhuFab are injected into the eye while the third is injected behind the eye. The medicines have not been approved by the FDA at this time pending review of additional data.

After treatment, repeated exams and angiographies are essential to monitor the macula for recurrent vessels. If leaking vessels recur, there will be distortion of central vision such that straight lines look curved or wavy.

One good way for patients to monitor their own vision is with an Amlser grid. This will be given to you to use regularly at home. At the first sign of a change in the pattern of the Amsler grid, you should contact the office immediately for an appointment.

Important facts to know before laser treatment
Treatment will not bring back perfect vision.
Treatment may produce a small blind spot (scotoma), depending on the type of laser used.
If successful, treatment will prevent further deterioration in central visual acuity. In some cases, significant improvement can occur.
Repeated office visits and Fluorescein and/or ICT angiography will be

needed following treatment.
Careful monitoring is important to detect any recurrence of the abnormal blood vessel growth.
Low vision lenses are often helpful.

PREVENTION

Smoking and Macular Degeneration
A large study has shown that the risk for developing late age-related macular changes for current smokers was 2.5 times the risk for persons who reported having never smoked. Also, current smokers were more likely to start developing early macular changes in their 50s and 60s than at older ages, with >50% having a higher risk for developing retinal pigmentary changes. These findings further support the view that smoking is a major risk factor for progression of AMD (Age-related Macular Degeneration). Furthermore, a decrease in risk can be seen following cessation of smoking.

Diet:
A large study has shown that vitamins C, E, A and Zinc are helpful in reducing the risk of developing abnormal blood vessels in patients with Age-related Macular Degeneration. The recommended doses are listed below. A diet high in Lutein and Zeaxanthin has also been shown to reduce the risk of vision loss in patients with Age-related Macular Degeneration.

Lutein-zeanxathin content of fruits and vegetables (micrograms/100G)

Kale 21,900
Collard greens 16,300
Spinach (cooked) 12,600
Spinach (raw) 10,200
Parsley (not dried) 10,200
Mustard greens 9,900
Dill (not dried) 6,700
Celery 3,600
Scallions (raw) 2,100
Leeks (raw) 1,900
Broccoli (raw) 1,900
Broccoli (cooked) 1,800
Leaf lettuce 1,800
Green peas 1,700
Pumpkin 1,500
Brussels sprouts 1,300

Summer squash 1,200
Corn (yellow) 790
Yellow pepper (raw) 770
Green beans 740
Green pepper 700
Cucumber pickle 510
Green olives 510

Dietary supplementation for patients with macular degeneration
Vitamin C 500mg.
Vitamin E 400iu.
Betacarotene 15mg
Zinc 80mg
Copper 2mg.

Finally, there is some evidence that sun exposure may exacurbate Age-related Macular Degeneration. Sunglasses should be worn when outdoors.