Increasing visual disturbances

Eye series 5

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During her consultation a 78 year old patient describes an increasing problem with her reading. She requires more light to read properly and has noticed, with great frustration, that she often seems to skip letters or entire words. She also complains of difficulty adjusting to dimly lit rooms when coming in from outside.

Figure 1. Yellow-grey spots around the macula area are called drusen

Question 1

What are the differential diagnoses?

Question 2

What is ARMD?

Question 3

Name the risk factors that help lead to this condition.

Question 4

What tests help to confirm the diagnosis?

Question 5

What are the treatment options?

Question 6

Describe the possible side effects of treatment.

Answers

Answer 1

- An outdated glasses prescription could cause blurred close vision but not other symptoms
- Lens changes or cataracts (visual loss tends to be generalised loss rather than specific word or letter loss)
- Glaucoma may lead to loss of visual fields (initial loss is in the peripheral vision)
- Various retinal conditions such as vein or artery occlusions, haemorrhaging or detachment (onset tends to be abrupt and the resulting symptoms dramatic)
- Age related macular degeneration.

Answer 2

Age related macular degeneration (ARMD) is a term that describes a combination of degenerative changes to the central retina. Initially these changes lead to problems with reading. The patient feels the need for more light with close work. With progression of the condition words may become increasingly blurry with blind spots appearing in the central vision. Lines that are straight may appear distorted and patients may ultimately complain of difficulty recognising faces due to the central field loss. Commonly patients will notice difficulty with night vision and with changing light conditions even though their visual acuity remains quite good. The patient may also complain that their vision appears to fluctuate.

Macular degeneration occurs when the retinal pigment epithelium cells are damaged either primarily by oxidative stress or secondarily through altered choroidal flow. Initially this results in deposits of metabolic debris (called drusen) (Figure 1) under the central macular area. Further, the sensitive retinal tissue is deprived of oxygen and its nutrients and atrophy of the retinal tissue begins. This stage is known as 'dry' ARMD.

To improve the blood supply to the area new vessels (choroidal neovascularisation) form. These vessels are weak and break easily causing bleeding and subsequent damage to the surrounding tissue. This is the 'wet' stage of ARMD.

Dry ARMD affects approximately 90% of patients with the disease. It is slowly progressive and is often bilateral although generally occurs asymmetrically. Wet ARMD, although accounting for the minority of cases, is responsible for approximately 88% of severe vision loss by the disease. Central vision loss is often rapid.

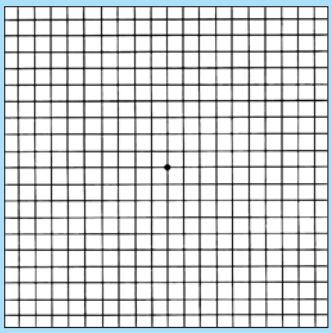

Figure 2. An Amsler grid to test central vision

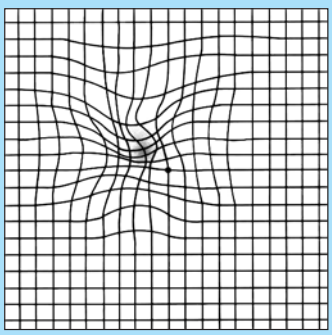

Figure 3. A person with ARMD may notice distorted wavy lines or blurred patches

Answer 3

Although the actual cause of ARMD is not known there are several known risk factors that increase the likelihood of the condition occurring. These include:

- age – from a 2% prevalence at 50 years, to almost 30% over the age of 75 years
- smoking – smokers are 2–3 times more likely to develop ARMD than nonsmokers
- race – ARMD is more common in light coloured races
- gender – women are more likely to develop ARMD than men
- family history – people with a family history are at a higher risk
- general health – cardiovascular disease and high cholesterol may increase the likelihood of ARND.

Answer 4

A vision test will help to measure vision loss. A yearly dilated retinal examination will reveal the typical changes to the macula. If wet ARMD is suspected, a flouroscein angiogram is used to evaluate the blood flow and detect any leakages that require laser treatment. Central vision changes can be monitored by use of the Amsler grid (Figure 2). Changes to the macula may manifest in horizontal and vertical lines appearing wavy and distorted (Figure 3).

Answer 5

The mainstay of treatment with dry ARMD is vitamin therapy to reduce the risk of progression. A major study[1] into macular degeneration, the AREDS (Age Related Eye Disease Study) has also shown that high doses of antioxidant vitamins and zinc may reduce the risk of progression in intermediate and severe cases of ARMD. Supplements do not prevent the initial development of the disease or improve the vision already lost. Low vision aids may provide additional support during the later courses of the condition.

There are several options for the treatment of wet ARMD although treatment is primarily aimed at stopping the progression of the disease course and the resultant retinal changes. Retinal damage that has already occurred cannot be reversed. Success depends and the location and extent of the abnormal blood vessels.

Photocoagulation is the use of a thermal laser beam to cauterise or coagulate the neovascular changes not located directly under the macula. If the patient had previously noticed dark or grey spots in their vision these areas will become permanently dark or blank due to the laser. There is the risk that the patient's vision may be worse after the laser treatment than beforehand. Research has shown that the patient is likely to maintain more sight with laser treatment than if no treatment had been received.

Photodynamic therapy through the use of intravenous verteporfin (Visudyne) enables the practitioner to treat the blood vessels that are located directly under the central macula or fovea where photocoagulation is contraindicated. The drug attaches itself to the lipoproteins in the bloodstream. Once the concentration of drug reaches appropriate levels at the target site, a dose of light with a low powered, nonthermal laser activates the drug causing the formation of free radicals at the site. This in turn causes endothelial cell death, which initiates clotting within the new vessel. This process has the advantage of not affecting the overlying retina.

Answer 6

Photocoagulation as stated previously will leave a paracentral scotoma. Although the blood vessels have been sealed bleeding can reoccur in at least 50% of cases.

Visudyne remains in the body for up to five days postinjection. As a result patients will become temporarily extremely photosensitive. Special care to avoid bright or direct lighting is essential during this time to avoid any reactions. Transient worsening of the vision occurs in approximately 1–4% of patients. Back pain during the infusion process occurs occasionally.

The high dosage of vitamin intake required can also lead to adverse effects. The AREDS[1] has shown that approximately 7.5% of patients had urinary tract conditions due to the high zinc dosage interfering with copper absorption. (This was offset later to some degree by introducing copper to the formulation). Large doses of beta carotene can lead to a yellowing of the skin and also further increases the risk of lung cancer in smokers. Vitamin A in doses greater than 7.5 mg per day has been shown to cause bone and skin disease, while large doses of vitamin E may lead to immunosuppression and clotting disorders.

Conflict of interest: none declared.

Reference

1. AREDS Research Group. A randomised, placebo controlled, clinical trial of high dose supplementation with vitamins C and E, beta carotene, and zinc for age related macular degeneration and vision loss. Arch Ophthalmol 2001; 119:1417–1436.

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