Nonneovascular AMD (III): Management

- **micronutrients**
  - **AREDS**
    - formula
      - vitamins C (500 mg)
      - vitamin E (400 IU)
      - beta carotene (15 mg)
        - increases rate of lung cancer in current smokers
      - micronutrient zinc (80 mg zinc oxide and 2 mg cupric oxide to prevent zinc-induced anemia)
    - participants
      - patients with intermediate or advanced AMD
        - intermediate (stage 3) AMD
          - ≥ 1 large druse (≥125 µm), extensive intermediate drusen (63–124 µm diameter), or nonsubfoveal GA
        - advanced (stage 4) AMD
          - vision loss due to neovascular AMD or subfoveal GA in only 1 eye
    - results
      - at 5 years
        - 25% reduction for progression of intermediate or advanced AMD to more-advanced stages
        - 19% reduction of moderate vision loss (≥3 lines of visual acuity)
      - at 10 years
        - 44% of placebo recipients compared with 34% of the supplement recipients had advanced AMD (a 23% risk reduction)
      - no benefit in participants with no AMD or with only early-stage AMD (a few small drusen)
      - no increased mortality among patients taking the formula
    - 4-point grading scale
      - risk factors were totaled across both eyes to reach a number between 0 and 4
        - presence of ≥1 large (≥ 125-µm diameter) drusen (1 point) 1
        - presence of any pigment abnormalities (1 point) 2
        - for patients with no large drusen, presence of bilateral intermediate (63–124 µm) drusen (1 point) 3
        - presence of neovascular AMD (2 points) 4
      - development of advanced AMD (5- and 10-year risks)
        - 0 factors
          - 0.5%
          - 1%
        - 1 factor
          - 3%
          - 7%
        - 2 factors
          - 12%
          - 22%
        - 3 factors
          - 25%
          - 50%
        - 4 factors
          - 50%
          - 67%
    - AREDS group recommendations
      - identify patients at high risk of AMD progression
        - extensive intermediate drusen
        - ≥1 large druse
        - noncentral geographic atrophy
        - advanced AMD in 1 eye
      - consider supplementation with combined antioxidant & mineral
        - avoid beta carotene in patients who smoke
      - early AMD
        - supplementation not shown to be beneficial
      - no AMD but at high risk of AMD
        - supplementation not tested
        - maintain balanced diet
        - avoid risk factors
  - **AREDS 2**
    - methods
      - added omega-3 long-chain polyunsaturated fatty acids (LCPUFAs: docosahexaenoic acid [DHA] and eicosapentaenoic acid [EPA])
      - replaced beta carotene with xanthophylls (lutein and zeaxanthin)
    - results
      - overall risk reduction similar to the original AREDS study
      - addition of LCPUFAs did not decrease the rate of progression to advanced AMD
      - lutein and zeaxanthin had similar effects to beta carotene, but without its increased risk for lung cancer in current and former smokers
      - confirmed 80 mg of zinc as an appropriate dose for AMD prophylaxis
    - formula
      - vitamins C (500 mg)
      - vitamin E (400 IU)
      - lutein (10 mg)
      - zeaxanthin (2 mg)
      - zinc (80 mg)
      - micronutrient zinc (80 mg)
    - recommendation
      - patients with stage 3 or 4 AMD are advised to take the AREDS2 supplement.
      - intermediate (stage 3) AMD
        - ≥ 1 large druse (≥125 µm), extensive intermediate drusen (63–124 µm diameter), or nonsubfoveal GA
      - advanced (stage 4) AMD
        - vision loss due to neovascular AMD or subfoveal GA in only 1 eye
- **education & follow-up**
  - educate high risk patients about symptoms of advanced AMD
  - educate office staff to respond promptly to patients with new symptoms
  - periodic examinations
- **Amsler grid**
  - each eye tested individually with reading glasses and at reading distance
  - online or smart-phone applications
    - allow instant uploading
- **Hyperacuity testing**
  - Vernier acuity
    - ability to detect deviations in alignment of visual objects
  - Hyperacuity
    - ability to discern minute deviations on a line
  - preferential hyperacuity perimeter (PHP)
    - can detect recent-onset CNV in intermediate AMD patients
      - high specificity (88%)
      - high sensitivity (82%)
  - Shape-discrimination hyperacuity (SDH)
    - tests for discrimination of shapes
      - perfect circle vs distorted circle
    - handheld SDH test can be implemented as a smartphone application
- **lifestyle changes**
  - smoking cessation
  - blood pressure control
  - obesity reduction
  - no studies have proven a relationship between UV light and AMD
- **experimental treatments**
  - anecortave acetate
    - angiostatic steroid
    - posterior sub-Tenon injection
  - ciliary neurotrophic factor
    - encapsulated cell intraocular implant
- **Disproven treatment approaches**
  - macular laser photocoagulation
    - stimulates drusen resolution or reduction
    - no associated change in the natural course of vision loss or CNV development
  - rheopheresis
    - extracorporeal blood filtration TO remove circulating macromolecules
      - decreases blood & plasma viscosity
    - no benefit over sham treatment at 12 months
  - Lampalizumab (anti-factor D)
    - selectively inhibits activation of the alternative complement pathway
    - not effective in preventing AMD progression

Ophthalmology Mind Maps/Arman Mashayekhi, MD