

Age Related Macular Degeneration (AMD)

Background

1. Definition:
 - Breakdown of light-sensitive cells of the macula leading to progressive loss of central vision, sparing of peripheral vision
2. Leading cause of vision loss & legal blindness in adults over 60 y/o
3. Patients rarely complain of symptoms until disease (Dz) advanced
4. Dz responds to early detection/ prevention

Pathophysiology

1. Theories
 - Build-up of waste products (environmental & dietary)
 - Family hx
 - Breakdown of retinal circulation
 - HTN, smoking
2. Two forms
 - Wet AMD (exudative)
 - 10% of initial presentations
 - 80% of legal blindness or severe visual loss
 - Abnormal blood vessel growth with fluid leakage behind macula
 - Rapid vision loss – months to years
 - Dry AMD (Atrophic)
 - 90% of pts at onset
 - 13%-18% progress to Wet AMD at three years
 - Slow breakdown of macular cells – will see drusen deposits & chorioretinal atrophy
3. Prevalence: Dz affects 25-30 million people worldwide
4. Incidence rate in US – based on study involving 4000 people followed over 15 years - incidence of early and late AMD was 14.3 and 3.1 percent respectively.¹
 - Incidence expected to triple by 2025 secondary to aging Baby Boomers
5. Risk factors
 - >50 y/o, family hx, fair skin, blue eyes, farsighted vision, h/o: smoking, Htn, diabetes, CVD, exposure to UV light, obesity, cataract surgery, diet
6. Depression common secondary to vision loss

Diagnostics

1. History
 - Normal changes as eye ages
 - Difficulty adjusting to changes in light
 - Changes in color perception
 - Loss of contrast
 - Floaters
 - Dry, burning, or sandy feeling in eyes
 - Phantom visions (Charles Bonnet Syndrome)

- Symptoms of possible AMD:
 - Inability to find personal article in familiar environment
 - Difficulty recognizing faces
 - Print appears faded, colors washed out
 - Water spots in center of pages
 - Difficulty distinguishing colors
 - Spilling reaching across table
 - Problems with depth perception
 - Wet AMD: early symptom → distortion of straight lines, i.e. poles, appear wavy
 - Dry AMD: early symptom → gradual blurring of central vision
2. Physical exam
- Dx made primarily by symptoms
 - Full ophthalmologic exam indicated if suspected
 - Neovascularization
 - Drusen: lipid and calcium deposits under retina
 - Small numbers normal as eye ages
 - Large amount associated with AMD
3. Differential Diagnosis
- R/o other causes of vision loss: diabetic retinopathy, chronic Htn, CVD

Therapeutics

1. Diet & nutritional supplements
- Antioxidants
 - No more effective than placebo in prevention of age-related macular degeneration
 - Antioxidants in combination with zinc
 - Modest benefit in reducing progression to advanced macular degeneration
2. Treatment for Wet AMD
- Laser surgery
 - Only effective in small percentage of pts
 - Greater risk than benefit
 - Photodynamic therapy
 - Verteporfin injected IV; activated by retinal illumination
 - Slows progression of dz, does not restore vision
 - Referral to low vision specialist to maintain lifestyle despite vision loss
 - Glucocorticoids – uncontrolled trials –shows benefits, requires randomized trials.^{2,3,4}
 - VEGF (Vascular endothelial growth factor) Inhibitors
 - Ranibizumab – for those with acute and later lesions of fovea and no preserved vision in second eye. Also for large or well defined extrafoveal lesions (**Grade 1B**)²
 - Bevacizumab –same as ranibizumab (antibody fragment of bevacizumab with modification) (**Grade 1B**)³

- Pegaptanib –more side effects than benefits as compared to ranibizumab and bevacizumab^{4,5}

Prevention

1. Early detection & prevention critical due to poor prognosis of advanced disease
2. Prevention/delay
 - Diet high in Lutein rich foods (dark-green leafy veg, yellow/red peppers, squash, pumpkin, kale)
 - Annual eye exams after 55 y/o
 - No clear evidence to benefits of prevention; however, in wet AMD, supplementation with vit D, E, zinc, copper, beta carotene delays progression^{6,7}
 - Smokers should be supplemented with only zinc, as beta-carotene linked to increase risk of lung cancer and coronary disease⁸
 - Decrease omega-6 fatty acids (vegetable oils), incr. omega 3 (cold-water fish...sardines, herring, salmon and tuna)
 - Eliminate trans. fats (burgers, fries, high cooking heat)
 - Regular exercise
 - Maintain normal BP and normal lipids for age and comorbidities
 - Sunglasses to block UV (need to say UV blocking)
 - Avoid tobacco, in any form, but smoking worst

Prognosis

1. Prognosis worsens with degree of disease
2. Can lead to complete vision loss
3. Early detection via careful hx critical to implement treatment and prevent progression

Evidence-Based Inquiry

1. What is the role of antioxidants in age-related macular degeneration?
2. What is the role of antioxidants in macular degeneration?

References

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