

1  **Macular Degeneration**

**An Update**

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2  **Lecture Outline**

- What is Age Related Macular Degeneration (ARMD)?
- What Are the risk factors?
- What Are The Symptoms of AMD?
- What Is the Treatment?
- Common Questions?
- Questions from the Floor.

3  **Macular Degeneration**

**2 Types of AMD**

- ‘Dry’ Macular Degeneration
- ‘Wet’ Exudative Macular Degeneration
  - 15 million in US have AMD
  - 1.5 million of the exudative form

4  **Normal Vision**

5  **Vision With Wet AMD**

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9  **Dry AMD = Aging of the Retina**

10  **Wet (Exudative) AMD**

Blood Vessels Grow Beneath The Retina and Bleed

11  **Risk Factors**

- Family History
- Female Sex
- Light Eye Color
- \*Smoking, Hypertension, Obesity, Elevated Lipids, Cholesterol

12  **What Are Not Risk Factors**

Cataract Surgery  
Sun Exposure

13  Treatment Options-Dry AMD

- Vitamins, Fish Oil
- Research Trials

14  Treatment options-wet AMD

- Vitamins
- Intravitreal Injections (Avastin Vs Lucentis)
- PDT
- Steroids
- Combination
- Clinical Trial Drugs (VEGF trap, SiRNA, Combination Treatment)

15  Vitamins

- ARED's Formula (Vitamins ACE, Zinc)
  - Modified Vitamins C,E, Lutein (5-10mg), Zinc
  - Icaps, Preservision, Other (Viteyes)

16  Treatment of 'Wet AMD'

17  Avastin/Lucentis

- 95% lose three lines or less once treatment is started.
- 75% remain stable
- 40% Improve
- 40% Maintain Reading Vision (20/40)

18  The Avastin/Lucentis Controversy

- Both work about the same
- Both Are Safe
- Lucentis has been formally tested
- Avastin is used 'off label'
- Major Cost Difference (Lucentis >\$2100/injection; Avastin \$50/injection)

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20  How Does The Drug Work?

- VEGF Stimulates New Abnormal Blood Vessels to grow
- Avastin/Lucentis Inhibits VEGF

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22  Risks of Avastin/Lucentis

- Elevated BP
- Stroke
- Heart Attack
- Death

23  **Intra Ocular Drug Injection**

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25  **Which Is Better, Avastin or Lucentis?**

- NEI Has Started a Comparison Trial

26  **Avastin will continue to be used off label for other diseases:**

- Diabetic Retinopathy
- Retinal Vascular Occlusions
- Swelling of the retina

27  **PDT with Visudyne**

- PDT Dye Injected into Vein
- ‘Cold Laser’ Activates the Dye which shuts down the blood vessels
- Now used as part of COMBINATION Therapy

28  **Steroids**

- Used as part of COMBINATION therapy
- Side Effects
  - Elevated eye pressure in 40%
  - Cataract in all patients

29  **Why Combination Treatment?**

- Less Number of Injections needed per year
  - Reduces injections treatment from monthly to 3-4 per year or less

30  **Clinical Trials**

- The Only We We Can Determine Which Treatment Works Best.
- People Who Enter Trials are Helping Their Children and Grandchildren

31  **Present Trials**

- VEGF Trap
- SiRNA
- Combination Trials
- Others

32  **Future Treatments**

- Stem Cells
- Drug Delivery Devices

- Computer Chips
- Gene Therapy
- New Lasers
- Eye Drops

33  **How I Answer Difficult Patient Questions on AMD?**

34  Common Question #1

35  Genetics of AMD

36  Is AMD Inherited?

- Yes
- Chromosomes
  - Nearly every chromosome
  - 1q, 10q
- 3 genes
  - ABCA4 Stargardt-disease gene may be associated with AMD
  - Apolipoprotein E protective

37  Genetics

- Positively associated genes
- Negatively associated genes
  - Best-disease gene not associated with AMD
  - Doyme’s familial honeycombed choroiditis —negatively associated

38  Common Question #2

- **“One of my parents has AMD; am I going to get it?”**
- **Related question: “One of my parents with AMD is taking some vitamins and minerals; should I take this too?”**

39  Micronutrients

- AREDS Study—decreased rate by 25%
- Other nutrients
  - A low intake of certain nutrients may be associated with an increased risk of AMD
  - Omega-3 fatty acids
  - Lutein/zeaxanthin reduced risk by 40%

40  Docosahexaenoic Acid (DHA)

- DHA (omega-3) associated with decreased risk of AMD

- May be a 50% reduction
- 1 serving per week is associated with a 40% decrease in risk of AMD

41  AREDS II

- Incorporate lutein/zeaxanthin and omega-3 fatty acids

42  Beta-carotene

- Not vitamin A = osteoporosis

43  Zinc

- 80 mg is a high dose—consider lower dose

44  Common Question #3

- **“I was taking two large tablets twice a day with meals. I saw the same formulation sold as a gel cap, in which I only have to take one gel cap twice a day. Can I switch to the gel caps?”**
- **Related question: “I can’t take two tablets twice a day. It’s hard for me to swallow, and I think I get indigestion. Can I take just one tablet a day?”**

45  Common Question #4

- **“I’m still a cigarette smoker. Is there another dietary supplement I should use other than the dietary supplement used in AREDS?”**

46  Common Question #5

- **“I’m taking ‘Macula 2020’ vitamins; is that the right formulation?”**
- **Related questions:**
  - **“Should I take vitamins with lutein or zeaxanthin? What about omega-3 fatty acids?”**
  - **“Do I have to take any other vitamins if I’m taking my eye vitamins?”**
- **“Should I eat a lot of green leafy vegetables for my AMD?”**

47  Common Question #6

- **“Am I more likely to die because of my AMD?”**
- **Is there an association between AMD and Mortality?**
  - Early AMD, 7.3%
  - Intermediate AMD, 9.3%
  - Advanced AMD, 14.7% (cardiovascular deaths)
- **AREDS study—zinc associated with reduced mortality**

48  Common Question #7

- **“Is it okay for me to be out in the sun?”**
- **“Should I wear sunglasses? What kind?”**

49  What Causes AMD?

Environmental Factors

- Smoking

- Sunlight exposure
  - No—Maryland Waterman Study 1989<sup>1</sup>
  - Maybe, if extended 10-year exposure—Beaver Dam Eye Study<sup>2,3</sup>
- Diet
- Iris color
  - No<sup>1</sup>
  - Maybe<sup>2,3</sup>

50  **What About Skin Pigmentation?**

- Is very fair skin a risk factor for AMD?
- Maybe—Blue Mountains Eye Study
- Compared to persons with fair skin, those with very fair skin had:
  - An increased risk of developing geographical atrophy (odds ratio [OR] 3.5, 95% confidence interval [CI] 1.2-10.4)
  - Persons with sun-related skin damage were less likely than those without to develop indistinct soft drusen (OR 0.6, 95% CI 0.4-0.9).

51  **Common Question #8**

- “Does Cataract Surgery Affect AMD?”
- Bottom line = NO

52  **Common Question # 9**

- “How bad will my vision get?”
- “Will I go blind?!”
- What are my chances of vision loss over the next 5 years?

53  **AREDS Clinical Severity Scale for AMD**

- Large drusen = >125 microns = vein width at disc margin
- Pigment changes
  - Hyperpigmentation
  - Hypopigmentation
  - Geographic atrophy

54  **Severity Scale = 0–4**

- Right eye
  - Large drusen = 1 point
  - Pigment changes = 1 point
- Left eye
  - Large drusen = 1 point
  - Pigment changes = 1 point

55  **5-Year Risk of Developing Advanced AMD**

- 0 points            0.5% risk
- 1 point            3.0% risk
- 2 points            12% risk

- 3 points            25% risk
- 4 points            50% risk

- If one eye advanced, count as 2 points

56  **When Is Low-vision  
Rehabilitation Indicated?**

- When the patient's visual needs are not met with conventional glasses

57  **Common Question #10**

- **“Is it okay to take aspirin if I have AMD?”**
- **“How about Coumadin?”**

58  **Common Question #11**

- **“I have a large scar in both eyes:**
  - **Should I take a vitamin supplement?**
  - **Is Lucentis for me?**
  - **What about macular translocation?**
  - **Can I get a retina transplant?**
  - **What about this ‘retina chip’ I heard about?”**

59  **Thank You**