Ocular imaging: recognizing what you see, managing what you diagnose, and preventing progression through patient engagement.

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The role of patient participation and engagement in the management of ocular disease is key for successful outcomes. We will review various case presentations and how to incorporate patient engagement in vision-threatening diseases with emphasis on using advanced imaging technologies to track disease progression.

I. Electronic Health Record (EHR) Incentive
   a. Meaningful Use (MU): the engagement of patients and family is a goal of the EHR incentive
      i. Improve understanding of health condition
      ii. Active role in health care
      iii. Family involvement in health care
      iv. Patient and family involvement in healthcare decision
      v. Patient management of health care
   b. Challenges to patient engagement
      i. Patient interest: Unhealthy patients may not be motivated. Healthy patients are too busy enjoying healthy lives, i.e. preventative care is not appealing.
      ii. Doctor interest: doctors lack the support team needed to maintain patient engagement programs.
      iii. Difficult Systems: Users complain about cumbersome, high maintenance systems that were designed without doctor or patient input.
      iv. Cost: low-cost, default systems are often older and not effective in modern medicine.

II. Case Presentations: Vision Threatening Disease
   a. Review
i. History & Exam Findings

III. Imaging: What would you order?

a. Color Fundus Photography & Posterior pole imaging technology
   i. RGB Filters: gross isolation of posterior pole layer.
      1. Red: longer wavelength (approx. 610 nm), penetrates to the choroidal layer. E.g. Choroidal nevus, CNVM.
      2. Green: mid wavelength (approx. 530-550 nm), isolates the retinal layer. E.g. retinal hemorrhage, exudate.
      3. Blue: shorter wavelength (approx. 490 nm) isolates the nerve fiber layer. E.g., cotton wool spot, NFL drop out.
   4. Emboss
      a. Topographical representation from a single color fundus photo.

b. Optical Coherence Tomography
   i. Time Domain (TD) vs. Spectral Domain (SD)
      1. TD: 400 A-scans/ sec; 6 radial slices, 30 deg apart, 10-15 micron resolution.
      2. Pathology could be missed within 30 deg slice.
      3. Longer acquisition time: challenges with fixation, nystagmus, children, etc.
      4. SD: 20,000-40,000 A-scans/ sec; 6mm area (vs. radial slices), 3-micron resolution.
         a. Shorter acquisition time: tolerance of motion artifact
         b. Repeatability, tracking over time.
   ii. OCT for Retinal Pathology
      1. Visible retinal layers: describing what you see
      2. IS-OS junction line (inner segment- outer segment of the photoreceptors (PR))
   iii. OCT for Optic Neuropathy
      1. R-NFL thickness
2. Thinning of the R-NFL occurs before VF defects manifest.
3. Macular map
4. Ganglion cell analysis
c. Fundus Auto Fluorescence (FAF)
   i. Lipofuscin (LF): aging and long term photo toxicity from Photo Receptors (PR) to RPE
   ii. LF accumulation in RPE with age, ocular pathology (ARMD, Stargardt’s, Best’s, Glaucoma, etc.).
   iii. Auto fluorescent properties of LF can be detected in-vivo using fundus spectrophotometer, confocal scanning laser ophthalmoscope, fundus camera.
   iv. What does it mean?
      1. Hyperfluorescent: increased LF concentration
      2. Hypoflurescent: absence of LF or RPE cell death.
   v. FAF Classification pattern in ARMD.

IV. Recognize: What do you see?
a. Case Presentations: Beyond what is visible
b. OCT
   i. High resolution SD OCT means more resolving power and detail of the retinal layers including the junction between the inner segment (IS) outer segment (OS) of PR
c. FAF: Predictive imagery

V. Management: What does it mean?
a. Interpreting ocular imagery
b. The whole diagnostic picture

VI. Prevention: Patient Engagement
a. Psychosocial manifestations of ocular disease & vision loss
i. Psychological profile. Detecting depression, consider adding these questions to your intake:

1. I still enjoy the things I used to enjoy
2. I can enjoy a good book, or radio or television program
   a. Depression was i.d. in a large number of ARMD pts. using quest #1 and #2.
3. I feel cheerful

b. Optometry’s role in healthy lifestyle counseling
   i. Diabetes Mellitus
   1. Document and Discuss the following:
      a. Blood Sugar (BS):
         i. Last BS (Fasting or non)
         ii. HbA1c (< 6.5-7.0)
      b. BP: (< 140/90)
      c. BMI: (Overweight = 25, Obese = 30)
      d. Lipid: Chol. (< 200, Trig < 150, HDL > 50)
      2. How do you motivate strict glycemic control?
         a. Patients with diabetic retinopathy want to hear about how to control this from their eye doctor.
         b. Further engagement in healthy lifestyle.
   3. Addressing Co-morbid depression
      a. DM increases the risk of depression by 200%
      b. Co-morbid depression leads to hyperglycemia and increased rates of DR, neuropathy, coronary, CV disease, increased mortality rates.

ii. Age-related Macular degeneration
   1. Age-related loss of QoL.
   2. 23-43% co-morbid depression
      a. Who will make the referral for treatment of depression?

iii. Glaucoma
1. Compliance: as disease severity increases, QoL decreases leading to higher rates of depression, lower rates of compliance, and increasing disease progression- a vicious cycle.

iv. Cataract

1. Mental health and cataract in elderly

c. Family engagement: What is the role of family support?