

# **Review of Systems – Live and Unplugged**

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## **Course Goal**

To provide clinically relevant information about the eye-body connection.

## **Course Objectives**

At the conclusion of this course, the attendee should be able to:

1. Describe relevant functional anatomy as pertains to common systemic conditions.
2. Explain methods to detect obesity, hypertension, and diabetes.
3. Cite at least 3 examples of smoking's deleterious effects on the eye.
4. Describe common systemic and ocular malignancies.
5. Detect dermatologic and ophthalmic features of rosacea.

## **Course Description**

The eye is an extension of the brain. We perform dilated funduscopy to not only assess the integrity of the eye's posterior segment, but also to detect telltale signs of systemic disease. In this course, several patient cases are presented that illustrate ocular complications of a variety of systemic diseases. The symptoms, clinical features, pathogenesis, diagnostic workup, and management of these conditions are reviewed.

## Course Outline

### Public Health Challenges and “Epidemics”

- Smoking
- Obesity
- Types 1 and 2 Diabetes
  - Children and adolescents
  - Adults
  - Diabetes in diverse populations
- Vision impairment and aging
  - Cataract
  - Age-related macular degeneration
    - Is AMD a systemic disease?
  - Glaucoma
  - Other optic neuropathies
  - Retinal vascular disease

### Connective Tissue and Dermatologic Disorders

- Ankylosing Spondylitis
- Sjogren Syndrome
- Pseudoxanthoma elasticum
- Ehlers Danlos syndrome
- Paget’s Disease
- Rosacea

### Endocrine Disorders

- Graves Disease
- Diabetes Mellitus
  - Some important systemic effects of diabetes that affect retinopathy and increase the risk of Heart Attack
  - **#1 Proteinuria**
  - First sign of renal disease
  - As nephropathy increases...the glomerular filtration rate falls
  - American Diabetes Association (ADA) recommends
  - yearly urinalysis
  - Random Spot Urine or 24 hour collection
  - **Normal <30**
  - **Microalbuminuria 30 mg – 299 mg**
  - **Albuminuria > 300 mg**
  - **#2 Anemia**
  - Gets more severe as renal disease worsens
  - Kidney production of “**Erythropoietin**” decrease, which means that less reaches the bone marrow and less red blood cells are made
  - Measured by Hematocrit (HCT) and hemoglobin levels in a CBC
  - If hemoglobin levels are less than 11g/dl = **anemia**
  - **Anemia** may actually be making the retinopathy worse!!!
  - Treat the patient with **Procrit** if patient is not on dialysis
  - also give iron
  - Kidney                      Erythropoietin                      Bone Marrow      RBC’s
  - **#3 Hyperlipidemia**
  - Cholesterol and triglyceride healthy levels should be < 200 mg/dl

- PCP should consider Lipitor if cholesterol high
- **#4 Hypertension**
- Target blood pressure for diabetics with nephropathy is 130 /80
- ACE inhibitors should be given if blood pressure is high
- ACE inhibitors are both renal-protective and anti-proteinuric
- **#5 Hyperglycemia**
- Induces vasoconstriction = kidney ( glomerular ) damage
- The Hemoglobin A1C should be as close to 7 % as possible

## Hematologic and Cardiovascular Disorders

- Giant Cell Arteritis
  - Acute painless vision loss (VA loss is usually permanent)
  - Pale swelling of the optic nerve head with flame shaped hemes
  - Central retinal artery occlusion may occur
  - Cranial nerve palsy (CN 3,4,6) may also be present, CWS
  - Possible association with “**Polymyalgia Rheumatica**” (PMR)
    - Stiffness in the neck, shoulder, and hip
    - 50 % of Giant Cell patients have PMR
    - Is there a link between GCA and PMR?
- Hypertension
  - Malignant HTH: Blood Pressure > **200/120**
    - Disc edema with or without exudate
    - Arterio-venous crossing changes
    - Nerve fiber layer infarcts (cotton wool spots)
    - Macular edema
    - Hard exudates / flame shaped hemes
    - Choroidal ischemia
- Leukemias
- Ocular Ischemic Syndrome
  - **Hypoperfusion Retinopathy / Ocular Ischemic Syndrome:**
  - Usually unilateral but may be bilateral in 20% of cases
  - Males > Females by a 2 to 1 ratio
  - Dot and blot hemes / microaneurysms found only in the mid-peripheral retina = Hypoperfusion Retinopathy
  - When the above is associated with neovascularization of the Disc,
  - Retina, Iris or Angle = Ocular Ischemic Syndrome
  - **Pathogenesis: Ocular Ischemic Syndrome:**
  - Atheromatous ulceration and stenosis at the bifurcation of the common carotid artery (90% occlusion has to be present)
  - **Symptoms: Ocular Ischemic Syndrome:**
  - Ocular and periorbital pain in **40%** of cases = “**Ocular Angina**”
  - Prolonged recovery of vision following exposure to bright light-known as “**Light Induced Amaurosis**”
  - Amaurosis Fugax ( Transient Monocular Blindness ) in 5% of cases
  - Transient Ischemic Attacks (TIA)
  - Vision Loss (90%) – Short Posterior Ciliary Arterial hypoperfusion
  - **Ocular Signs: Ocular Ischemic Syndrome:**
  - Dilated but not tortuous retinal veins
  - Retinal Hemorrhages in mid-peripheral retina (80%) of patients
  - Cotton Wool Spots (5%)
  - Neovascularization of the Disc (35%)
  - Neovascularization of the Retina (8%)
  - Rubeosis iridis (65%)
  - Uveitis – mild anterior (20%)

- Emboli (retinal)
- Lower IOP - initially
- **Work Up:**
- Carotid artery evaluation (Carotid – Duplex Scanning)
- Possible MRA (Magnetic Resonance Angiography)
- Cardiology work up (Echocardiogram) – Transesophageal
- Lipid Panel
- **Treatment:**
- Consider carotid surgery if warranted (Endarterectomy)
- Therapeutic approach – Aspirin (325 mg QD or BID)
- Panretinal photocoagulation (PRP) if neovascularization
- Stop smoking
- **Important Note:**
- Leading cause of death = **Ischemic heart disease**
- Second leading cause of death = **Stroke**
- Sickle Cell Disease

### Inflammatory Conditions

- Rheumatoid Arthritis
  - Keratitis sicca
  - Scleritis/episcleritis
  - Uveitis
- Systemic Lupus
  - In SLE and other autoimmune diseases, the immune system’s recognition apparatus breaks down—specifically, misguided T cells and autoantibodies contribute to the development of these conditions.
  - They begin to destroy healthy cells and tissues, leaving the body unable to perform vital functions and making it vulnerable to attack from actual pathogens.
  - The course of SLE may be unpredictable, with periods of exacerbation and remission.
- The Eye in SLE: Reported Ocular Complications of Lupus
  - Lids/lashes
  - Discoid rash, blepharitis
  - Ocular surface
  - Keratoconjunctivitis sicca, recurrent corneal erosions
  - Episclera/sclera
  - Episcleritis and scleritis of variable type and severity
  - Anterior chamber
  - Uveitis, frequently accompanies episcleritis/scleritis
  - Posterior segment
  - Cotton-wool infarct, retinal hemorrhages, hard exudates, retinal vascular occlusions, vasculitis, proliferative retinopathy
  - Choroid
  - Ischemia, effusions
  - Optic nerve
  - Optic neuritis, ischemic optic neuropathy
  - Oculomotor disorders
  - Secondary to vasculitic or ischemic events
  - Pupil disorders
  - Horner’s syndrome, tonic and light-near dissociation of pupils
  - Visual pathway
  - Retrochiasmal disease, intracranial hypertension
- Sarcoidosis
  - Sarcoidosis (also called sarcoid) is a granulomatous disease that can affect virtually every body system, especially respiratory and lymphatic systems

- A granulomatous condition is characterized by an organized collection of:
- Macrophages.
- Agents Implicated in the Etiology of Sarcoidosis:
- Viruses
- Herpes simplex
- Hepatitis C
- Epstein-Barr
- Cytomegalovirus
- Cocksackievirus
- Rubella
- Other Infectious agents:
- Mycobacteria (Mycobacterium tuberculosis, Mycoplasma species, atypical mycobacteria)
- Corynebacteria species
- Spirochetes
- Propionibacterium acnes
- Borrelia burgdorferi
- Histoplasma species
- Cryptococcus species
- Sporotrichosis.
- Environmental antigens:
- Metals (e.g., zirconium, aluminum, beryllium)
- Organic dusts (e.g., pine, pollen)
- Inorganic dusts (e.g., clay, soil, talc)

### **Infectious Disease**

- Syphilis
- Chlamydia
- Cytomegalovirus
- Gonorrhea
- Hepatitis B
- Herpes (HSV / HZV)
- HIV
- Bartonella (Cat scratch)

### **Other Disorders**

- Interferon Retinopathy
- Radiation Retinopathy
- Pupil-involved Third Nerve palsy
- May be caused by the following:
  - Aneurysm
  - Microvascular disease ( Infarction )
  - Tumor
  - Trauma
  - Infection (syphilis)