Radiation Retinopathy after Treatment of Choroidal Melanoma

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Abstract number: 2854

Abstract: A patient presents for decreased vision OD. His ocular history includes proton radiation treatment of choroidal melanoma. Examination reveals iris neovascularization, retinal neovascularization, retinal exudates, and vitreous hemorrhaging OD.

I. Case History
   a. Demographics
      i. 61-year old Caucasian male
   b. Chief complaint
      i. Increasing blurry vision OD
   c. Ocular history
      i. Choroidal melanoma s/p proton beam irradiation OD (56 GyE)
      ii. Amaurosis fugax OD
      iii. Peripheral retinal hemorrhages OS
      iv. Mild non-proliferative diabetic retinopathy OU
      v. Choroidal nevi OU
      vi. Cataracts OU
   d. Systemic history
      i. Diabetes Mellitus (15-20 years)
      ii. Hypertension
      iii. Anemia
      iv. Cough, migraine, hearing loss, hyperlipidemia, coronary artery disease, and chronic lower back pain
   e. Medications
      i. Acarbose, albuterol inhaler, atorvastatin, calcium/vitamin D, cyclobenzaprine, diltiazem, gabapentin, hydrochlorothiazide, hydroxyzine, indomethacin, insulin, insulin/glargine, losartan, metformin, mometasone, niacin, nitroglycerin, polyvinyl alcohol, artificial tears ointment

II. Pertinent findings
   a. Clinical
      i. Iris neovascularization OD
      ii. Lipid exudation OD
      iii. Retinal neovascularization OD
      iv. Vitreous hemorrhage OD
      v. Chorioretinal scars from proton beam irradiation OD
      vi. No retinopathy OS
   b. Laboratory studies
      i. HbA1c: 10.7
      ii. RBC: 4.7
      iii. HCT: 38.7
      iv. Platelets: 249
III. Differential diagnoses  
   a. Primary: radiation retinopathy  
   b. Others: diabetic retinopathy, ocular ischemic syndrome, venous occlusion, anemic retinopathy, and hypertensive retinopathy  

IV. Diagnosis & Discussion  
   a. Radiation retinopathy  
   b. Process  
      i. Irradiation causes free radical liberation, causing damage to vascular endothelial cells  
   c. Peak incidence around 2-3 years after irradiation treatment  
   d. Depends on amount of exposure: rare when less than 40 Grays  
   e. Exposure to eye, head, or neck can cause retinopathy  
   f. Signs include  
      i. Macular edema, capillary dilation, lipid exudates, neovascularization, cotton-wool spots, vascular sheathing, serous retinal detachment, telangiectasia, microaneurysms, intraretinal hemorrhages, optic neuropathy  

V. Management & Treatment  
   a. Management  
      i. Fluorescein angiography  
      ii. OCT  
      iii. Dilated exams every 3-6 months  
      iv. Prognosis: bad if there are areas of non-perfusion, can lead to progressive vision loss  
   b. Treatment  
      i. Focal/grid laser  
      ii. Panretinal photocoagulation  
      iii. Photodynamic therapy  
      iv. Intravitreal injections  
         1. Anti-VEGF  
         2. Corticosteroids  
         3. Treatment of Radiation Retinopathy Trial  
   v. 2 Case-reports of unconventional treatments  
      1. Oral pentoxifylline  
      2. Hyperbaric oxygen  

VI. Conclusion & clinical pearls  
   a. Review patient history  
      i. History of radiation to head/neck areas? How much? How long ago?  
   b. Signs/symptoms: similar to diabetic changes  
   c. Performing dilated fundus exams to monitor for changes  
   d. Referring to retinal specialist quickly and coordinating care  

Acknowledgements: Deana Lum, OD, FAAO, Alvaro Castillo OD, FAAO, James Esposito, OD, FAAO, George Bertolucci, MD, and the Tumori Foundation, San Francisco, CA