**Complications of Pharmaceuticals Every Optometrist Should Know!**

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CEE/TQ Course

**Course Categories:** Pharmacology

**Course Description:**

Optometrists use topical and oral (systemic) pharmaceuticals for the treatment of a variety of ocular conditions in patient care. Comparably, systemic medicines are used to treat numerous conditions by various practitioners in the healthcare system. These treatments or pharmaceutical agents have the potential to produce ocular adverse side effects and systemic complications. This course will discuss the complications and adverse events that every optometrist should know. This presentation will immediately aid in everyday patient care.

**Objectives:**

1. Identify the ocular pharmaceuticals that have the potential to cause systemic complications
2. Review and show the systemic complications produced by the treatment of the ocular condition
3. Identify the systemic pharmaceuticals that have the potential to cause ocular complications
4. Review and show the ocular complication produced by the treatment of the systemic condition
5. Discuss how the optometrist may be the first physician to identify these potential and at time serious adverse events of complications.

**Outline:**

1. Antibiotics
   1. Fluoroquinolones
      1. Levaquin™ (levofloxacin)
      2. Cipro™ (ciprofloxacin)
      3. Baxdela™ (delafloxacin)
         1. Retinal detachment
            1. 1 in 2,500 will experience
            2. Compared to 1 in 1,000 who will experience tendinitis
      4. Pictures reviewed of large horseshoe retinal tears
         1. Most likely from intravitreal injection of fluoroquinolone
2. Antibiotics (anti-inflammatory)
   1. Tetracycline analogs
      1. Vibramycin™, Doryx™ (doxycycline)
      2. Minocin™ (minocycline)
      3. Nuzyra™ (omadacycline)
      4. Seysara™ (sarecycline)
   2. Enhances the effects of
      1. Coumadin™ (warfarin)
      2. Digoxin™ (Lanoxin)
   3. Idiopathic intracranial hypertension
      1. Pseudotumor cerebri
      2. “It’s not rare if it’s in your chair”
         1. Various case presentations and examples shown from clinic
   4. Hyperpigmentation of face, fingers, and legs
      1. Various case presentations and examples shown from clinic
         1. Review leg photos of hyperpigmentation, day 1
         2. 6 Months Later
         3. 1 Year Later
3. Alpha 1 Blockers
   1. Treatment of enlarged prostate:
      1. Uroxatrol™ (alfuzosin)
      2. Flomax™ (tamsulosin)
         1. These two agents LIKELY have the highest incidence of causing floppy iris syndrome, as they are selective for alpha 1a receptors, which also predominate in the eye
   2. Treatment of CHF and/or hypertension
      1. Coreg™ (carvedilol)
         1. Alpha1/beta 2 blocker
   3. Treatment of refractory hypertension:
      1. Hytrin™ (terazosin)
         1. Alpha 1 blocker
   4. Ocular considerations and adverse events
      1. Floppy iris syndrome and miosis!
      2. After 4 rounds of phenylephrine, tropicamide, and cyclopentolate, if poor dilation
         1. Iris hooks
      3. What happens at the time of making the incision?
         1. Tricks with different viscoelastic agents
      4. Post op day 1, IOP 43
         1. What’s the caution?
4. Anti-arrhythmics
   1. Treatment of cardiac arrhythmia
      1. Cordarone™ (amiodarone)
         1. Corneal deposits
         2. Optic neuritis
   2. 65-year-old woman reports decreasing vision over past 6-9 months. Especially at near
      1. Vision 20/50 OU
      2. Topography showing irregular astigmatism resulting in reduced vision
      3. Topography- 6 Months Later, resolved irregular astigmatism
         1. Increased vision
   3. 67-year-old man complains of vision slowly deteriorating over the past 8 months
      1. History of NA-ION 10 months ago OD
      2. Patient sees family physician for physical due to recent NA-ION
      3. Patient has not been to PCP for 35 years
      4. Patient started Cordarone™
      5. VA 20/80 OD 20/25 OS (9 months ago)
      6. VA 20/400 OD 20/200 OS (today)
      7. CF: severe constriction OU
      8. SLE: vortex corneal whorls OU
      9. Amiodarone Optic Neuropathy- Toxic Optic Neuropathy
5. Toxic Optic Neuropathy Causes
   1. Myambutol™ (ethambutol) (TB)
   2. Isoniazid
   3. Antimicrobials
      1. Chloramphenicol, streptomycin, penicillamine
   4. Halogenated hydroxyquinolones
   5. Vigabatrin
   6. Disulfiram
   7. Tamoxifen
   8. Sildenafil
   9. Methanol
   10. Heavy metals
   11. Fumes
   12. Solvents
   13. Alcohol abuse
   14. Tobacco abuse
6. Osteoporosis Medications
   1. Bisphosphonates:
      1. Fosamax™ (Alendronate)
      2. Actonel™ (Risedronate)
         1. Episcleritis
         2. Uveitis
         3. Iritis
   2. Typically, the benefit of using these agents outweigh the risks for ocular side effects
   3. Encourage patients to get regular ophthalmic exams and to report any acute changes!
7. COX-2 Specific Inhibitors
   1. Celebrex™ (celecoxib)
      1. Cataracts
      2. Glaucoma
      3. Conjunctival hemorrhage
      4. Vitreous floaters
   2. Hey Celebrex, ™ where did your brothers Vioxx™ and Bextra™ go?!?!
      1. Oh, how we miss them…
8. Anticonvulsants
   1. Sabril™ (vigabatrin)
      1. Uncommon agent used in infantile spasms and in refractory partial complex seizures
      2. FDA mandated BLACK BOX WARNING:
         1. Optic atrophy
         2. Optic neuritis
         3. Peripheral constriction of visual field
         4. Decrease in visual acuity
      3. Toxic Optic Neuropathy
         1. Selective, irreversible, inhibitor of GABA transaminase for refractory complex partial seizures and infantile spasms
         2. Clearly been shown to cause a dose-dependent, permanent peripheral field constriction.
         3. The earliest reports of toxicity were after 11 months of exposure
            1. The vision loss is usually asymptomatic and spares the macula
            2. Sub-clinical depression of macular function and color vision deficits have been reported
         4. Mechanism has not yet been fully demonstrated
            1. Most likely involves toxicity to both retinal photoreceptors and ganglion cells
            2. Possibly induces a taurine deficiency that leads to toxicity
            3. Taurine supplementation may prevent toxicity
9. Autoimmune Agents
   1. Treatment of Multiple Sclerosis
      1. Gilenya™ (fingolimod)
         1. FDA-approved oral agent for the treatment of relapsing forms of multiple sclerosis (MS) in September 2010
         2. Macular edema
            1. FAME - Fingolimod-Associated Macular Edema
      2. 52-year-old woman, history of MS was switched from Tysabri™(natalizumab) to Gilenya™ (fingolimod)
         1. Blurred vision in her left eye, BVA 20/40
            1. Noticed blurred vision 7-8 weeks after starting Gilenya™
         2. Gilenya™ (fingolimod) & FAME
      3. Prior to starting medication
         1. Follow up in 3-6 months after medication started
      4. If FAME occurs
         1. Stopping Gilenya typically will reverse edema
            1. May need topical NSAID and/or steroid
      5. Another case of Gilenya™(fingolimod) and FAME
   2. Treatment of rheumatologic conditions
      1. Rheumatoid arthritis, systemic lupus erythmatosis
      2. Plaquenil™ (hydroxychloroquine)
         1. Bull’s eye maculopathy
      3. Immunosuppressive Medications
         1. Hydroxychloroquine (Plaquenil™) - Anti-malarial
         2. Ophthalmic side effects (infrequent with current dosing ranges)
            1. Irreversible retinal damage has been observed (“chloroquine retinopathy”)
            2. If there are any indications of abnormality in the color vision, visual acuity, visual field, or retinal macular areas, or any visual symptoms (eg, light flashes or streaks), d/c drug stat
         3. Revised Recommendations on Screening for Chloroquine and Hydroxychloroquine Retinopathy
            1. Recommendations were 2002 by the American Academy of Ophthalmology
            2. Improved screening tools and new knowledge about prevalence of toxicity have prompt the change
            3. 1% after 5-7 years of use or a cumulative dose of 1000 grams (Plaquenil)
            4. There is no treatment for this condition
            5. Therefore, must be caught early
            6. Screening for the earliest hints of functional or anatomic change
            7. Plaquenil toxicity is not well understood
         4. Revised Again
         5. 71-year-old woman with Lupus and hypertension
            1. Medications:

Klonopin™ (clonazepam)

Plaquenil™ 200 mg BID, 15 years

81 mg ASA

Prednisone

Cozaar™ (losartan)

* + - * 1. VA 20/25 OD/OS (mild cataracts)
        2. Patient was told to see an ophthalmologist in 2013
        3. Various visual fields reviewed showing toxicity
        4. Various OCTs reviewed showing toxicity
    1. Various cases will be reviewed showing visual fields and OCTs defecting Plaquenil toxicity

1. 62-year-old female being treated for tuberculosis
   1. Using Ethambutol
   2. Result toxic optic neuropathy
2. Thank you!
   1. Greg