Managing Medications That Effect Vision

By Sue Fosnight RPh, BCGP, BCPS

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OBJECTIVES

• Recognize medications that may contribute to vision changes and how to minimize their contribution to vision impairment

• Discuss methods to optimize medications for the treatment of eye disorders
DISEASES THAT AFFECT VISION

Primary Eye Diseases
- Macular degeneration
- Glaucoma
- Cataracts
- Diabetic Retinopathy

Non-Primary Eye Diseases
- Diabetes
- Hypertension
- Sarcoidosis
- Infections
MEDICATIONS THAT EFFECT VISION

More Common
- Anticholinergics
- Corticosteroids
- Digoxin
- Phenytoin
- Vigabatrin

Less Common
- Amiodarone
- Phosphodiesterase-5 Inhibitors
- Tacrolimus
- Topiramate
- Voriconazole
- Tamoxifen
- Indomethacin
MEDICATIONS THAT CAUSE VISION CHANGES: COMMONLY OCCURRING
GENERAL MANAGEMENT

• Alternative medication if able especially if other eye impairments
• Regular eye exams
• Counsel patient to report changes in vision
ANTICHOLINERGICS

- Effects:
  - Dry eyes
  - Blurred vision
  - Aggravates glaucoma

MEDICATIONS HIGH IN ANTICHOLINERGIC EFFECTS

Tricyclic Antidepressants
- amitriptyline (Elavil®, Endep®)
- desipramine (Norpramin®)
- doxepin (Sinequan®) >6mg/day
- imipramine (Tofranil®)
- nortriptyline (Pamelor®)

Other Antidepressants
- paroxetine (Paxil®)

Antihistamines
- diphenhydramine (Benadryl®)
- hydroxyzine (Vistaril®, Atarax®)
- chlorpheniramine

Anti-emetics
- promethazine (Phenergan®)
- prochlorperazine (Compazine®)
- thiethylperazine (Torecan®)
- trimethobenzamide (Tigan®)

Muscle relaxants
- cyclobenzaprine (Flexeril®)
- orphenadrine (Norflex®)

Antipsychotic Agents
- chlorpromazine (Thorazine®)
- clozapine (Clozaril®)
- loxapine (Loxitane®)
- olanzapine (Zyprexa®)
- perphenazine (Trilafon)
- thioridazine (Mellaril®)
- trifluoperazine (Stelazine®)

Anticholinergics
- atropine/belladonna (B&O supps®)
- hyoscamine (Levsin®)
- flavoxalate (Urispas®)
- dicyclomine (Bentyl®)
- benzotropine (Cogentin®)
- oxybutynin (Ditropan®)

# ALTERNATIVES TO ANTICHOLINERGICS

<table>
<thead>
<tr>
<th>For</th>
<th>Common Alternatives:</th>
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<tbody>
<tr>
<td>Spasms</td>
<td>Lowest effective dose for shortest effective time</td>
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<tr>
<td>Allergies</td>
<td>Saline nasal spray, Second Generation antihistamine, intranasal steroids, If acute allergic reaction: Lowest effective dose for shortest effective time</td>
</tr>
<tr>
<td>Incontinence</td>
<td>Trospium</td>
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<tr>
<td>Parkinson’s Disease</td>
<td>Carbidopa/levodopa</td>
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<tr>
<td>Insomnia</td>
<td>Non-pharmacological methods, ramelteon, melatonin</td>
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<tr>
<td>Depression</td>
<td>Venlafaxine, Duloxetine, Sertraline, Mirtazapine, Buproprion,</td>
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<tr>
<td>Psychosis</td>
<td>Atypical antipsychotics</td>
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<tr>
<td>Pain</td>
<td>Acetaminophen, appropriately doses of opioids ( tramadol, oxycodone, morphine preferred, but careful with morphine if reduced renal function)</td>
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<td></td>
<td>For Neuropathic pain: Gabapentin, Pregabalin, Lidoderm Patch, Capsacian cream,</td>
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<tr>
<td>Nausea</td>
<td>Ondansetron; Use lowest effective dose for shortest effective time</td>
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CHRONIC CORTICOSTEROIDS

• Elevation of intraocular pressure- Glaucoma
• Cataracts (22% incidence)
SYSTEMIC CORTICOSTEROIDS

- Betamethasone (Celestone Soluspan®)
- Budesonide (Entocort®, Cortiment®)
  - Less systemic absorption
- Cortisone
- Deflazacort (Emflaza®)
- Dexamethasone (Zonacort®, Dexpak®)
- Fludrocortisone (Florinef®)
- Hydrocortisone (Cortef®, Solu-Cortef®)
- Methylprednisolone (A-Methypred®, Solu-Medrol®)
- Prednisolone (Pediapred®, PMS-Prednisolone®)
- Prednisone (APO-Prednisone®, TEVA-Prednisone®)
- Triamcinolone (Kenalog®, Aristospan®)
ORALLY INHALED CORTICOSTEROIDS

- Beclomethasone (QVar®)
- Budesonide (Pulmocort®, Symbicort® – with formoterol)
- Ciclesonide (Alvesco®)
- Flunisolide (Aerospan®)
- Fluticasone (Flovent®, Arnuity®, Advair®, Airduo®-with salmeterol, Breo-Ellipta® – with vilanterol)
- Mometasone (Asmanex®, Dulera® – with formoterol)
NASAL CORTICOSTEROIDS

- Beclomethasone (Beconase AQ, Qnasl)
- Budesonide (Rhinocort® – with formoterol)
- Ciclesonide (Omnaris, Zetonna®)
- Flunisolide (Nasalide, Rhinalar®)
- Fluticasone (Flonase®, Ticaspray®, Dymista® – with azelastine)
- Mometasone (Nasonex®, Propel Mini®)
- Triamcinolone (Nasocort Allergy 24®, Nasal Allergy 24®)
ADDITIONAL MANAGEMENT

- Use steroids for shortest term possible
- Use local steroids when possible
- Attention to administration technique
- Assess for ocular changes including intraocular pressure if using systemic corticosteroids for >6 weeks
DIGOXIN

- Color vision change when at toxic levels
- yellow and green hued vision or halos
- Incidence=60% to 80% with toxic levels

ADDITIONAL MANAGEMENT

• Use low doses when possible
  – Titrate to level of 0.5 to 1 ng/ml when treating CHF
• Monitor levels
PHENYTOIN

• Nystagmus- with toxicity

Types of Nystagmus
ADDITIONAL MANAGEMENT

- Monitor levels especially in those with poor nutrition or renal dysfunction
VIGABATRIN (SABRIL®)

- Visual Field Loss >30%
  - Risk Evaluation and Mitigation Strategies Program (REMS)
    - Requires provider training and registration
    - Requires eye exam within 4 weeks of starting and every 3 months while taking and 3 to 6 months after stopping

- Nystagmus

- Blurred vision

MEDICATIONS THAT CAUSE VISION CHANGES
LESS COMMON
AMIODARONE

• Types
  – Keratopathy (<10%)
    • Halos
    • Colored rings
  – Optic Neuropathy (1%)
    • Blurred vision
    • After discontinuing
      – 80% improve or stabilize
      – 20% worsen

Wang AG. Neuroophthalmology 2016; 18;41:55-58
ADDITIONAL MANAGEMENT

• Evaluate benefits versus risk of therapy
• Evaluate dose
PHOSPHODIESTERASE-5 ENZYME INHIBITORS

• Incidence: 2-11%
  Reported with sildenafil

• Effects:
  – Transient blue or green tinge around objects
  – Photophobia
  – Blurred vision
PHOSPHODIESTERASE-5 ENZYME INHIBITORS

- Sildenafil (Viagra®, Revatio®)
- Tadalafil (Adcirca®, Cialis®)
- Vardenafil (Levitra®, Staxyn®)
- Avanafil (Stendra®)

More likely with sildenafil and avanafil
TACROLIMUS

• Incidence : >10%
• Effects
  – Optic neuropathy
  – Blurred vision
TOPIRAMATE

- Incidence: 1% to 7%
- Effects
  - Blurred vision
VORICONAZOLE

• Incidence: 19%
• Effects
  – Color vision changes
  – Photophobia
• Additional Management
  – Short term use
  – Eye exam if using for >28 days
TAMOXIFEN

• Cataracts
  – Best documented with much higher doses than routinely used

• Decreased color perception- blue tinged
INDOMETHACIN

- Retinopathy with chronic high dose use
MEDICATIONS THAT RARELY CAUSE VISION CHANGES
# RARE OPHTHALMIC EFFECTS

<table>
<thead>
<tr>
<th>Medication</th>
<th>Effects</th>
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<tbody>
<tr>
<td>Hydroxychloroquine</td>
<td>Retinopathy</td>
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<tr>
<td>Isoniazid</td>
<td>Optic Neuropathy</td>
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<tr>
<td>Isoretinoin</td>
<td>Conjunctivitis, Blepharitis, Decreased night vision</td>
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<tr>
<td>Ethambutol</td>
<td>Optic Neuropathy</td>
</tr>
<tr>
<td>Phenothiazines (Chlorpromazine, Fluphenazine, Perphenazine, Prochlorperazine, Promethazine, Thioridazine, Trifluoperazine)</td>
<td>Cataracts, Retinal Degeneration</td>
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TIPS TO OPTIMIZE EYE MEDICATIONS
Asymptomatic Disease

Treatment with Bothersome Adverse Effects

Adherence
RESULTS OF NON-ADHERENCE TO EYE DROPS

• Not well studied
• Poor adherence has been associated with progression of glaucoma in several studies

Broadway AC, et. al. Drugs Aging 2015;32:569–581
Sleath B. Ophthalmology. 2011;118:2398–402
IMPROVING ADHERENCE

• Assess for adherence on a regular basis
  – Cost: Faster entry into Medicare Part D gap
  – Organization: Pill boxes are not helpful for eye drops-alternative system for those that need reminder
  – Side Effects: Many eye drops causing unpleasant effects with use
  – Transportation: Often issue for elderly. Sometimes not easy to recognize when down to end of container
  – Benefits: Sometimes difficult for patient to recognize if asymptomatic disease
    • Motivational interviewing techniques
ADMINISTRATION

• Assess to ensure proper administration
  – Coordination to ensure bottle is not contaminated and drops get to the eye
  • Need for device/assistance
    – https://www.amazon.com/Maddak-Inc-Autodrop-Drop-Guide/dp/B00DH311QY/ref=sr_1_2_a_it?ie=UTF8&qid=1496855193&sr=8-2&keywords=eye+drop+dispenser#customerReviews
    – Efficacy
  – Gels and Suspensions: Wait 10 minutes before administering another ophthalmic medication
  – Drops: 5 minutes between multiple medication drops
  – Contacts: Wait 15 minutes before inserting contacts after drops
  – Limit Systematic Absorption: Close lacrimal duct
For 2 minutes or more, firm pressure is maintained with the forefinger or thumb over the inner corner of the closed eyelids. Lid closure is more important than pressure over the lacrimal sac in decreasing systemic absorption. Any excess medication should be blotted away before pressure is released or the eye is opened.
SUMMARY

• Many medications can contribute to ocular changes
• Avoidance of these medications whenever possible is preferable, especially for those already with ocular disease
• Regular monitoring for these side effects when avoidance is not possible is essential
• Non-adherence to ocular treatment medications contributes to progression of disease
• Adherence interviews and counseling may improve adherence to ocular treatment medications