Financial Disclosures

• None to declare
Overview

Known ocular side effects of medications that your patients may be taking
Drugs used to treat these conditions are associated with ocular side effects:

- High Blood Pressure
- Osteoporosis
- Headaches
- Irregular Heartbeat
- Angina
- CHF
- Erectile Dysfunction
- Malaria Prophylaxis
- Depression
- Anxiety
- Hormones/Birth Control
- High Cholesterol
- Stroke/MI
- Infections
- Enlarged Prostate
- Cancer
- Cancer Prophylaxis
- Allergies
- Diabetes
Cardiac Drugs

Beta Blockers

- Dry Eye
- Lower IOP (Pt. may seem to have NTG)

Amiodarone

- Whorl-like corneal deposits
- Interior and posterior lens changes
- Rare – optic neuropathy and pseudotumor cerebri
Whorl-like Corneal Deposits
Cardiac Drugs

Digoxin

- Change in color vision
- Visual sensations or flickering
- High doses can result in retinal and optic nerve toxicity
  - Farnsworth 100 hue test helpful
- Lowers IOP – not used in treating glaucoma due to numerous and serious side effects
Anti-hypertension Drugs

Diuretics

• e.g. Hydrochlorothiazide (Microzide), Furosemide (Lasix), Spironolactone (Aldactone)
• Dry eye (common)
• Reported, but very rare – band keratopathy and myopic shift

ACE Inhibitors

• Rare – decreased vision, photophobia, and conjunctivitis
Diabetes Drugs

- No direct ocular side effects

- Transient shifts in refraction are seen as glucose levels stabilize
  - Any time a diabetic goes on or off of an antihyperglycemic agent, there may be refractive shifts
Oncology Drugs – Chemotherapy Agents

- Blurred Vision
- Photophobia
- Conjunctivitis
- Diplopia
- Keratitis

- Optic neuropathy
  - Cisplatin
  - Carboplatin
  - Methotrexate
  - Paclitaxel
  - Vincristine
  - Tamoxifen
Oncology Drugs – Tamoxifen (Nolvadex) or Toremifene (Fareston)

- Intra-retinal crystals
- Posterior sub-capsular opacities
- Keratitis
- Optic neuropathy
Oncology Drugs – Tamoxifen (Nolvadex) or Toremifene (Fareston)

Refractile Crystals in the Perifoveal Area

Foveal Cystic Changes on OCT
Oncology Drugs - Interferons

- Ocular pain
- Conjunctivitis
- Cotton wool spots
- Optic neuritis
- Severe dry eye
Oncology Drugs - Interferons

Interferon Retinopathy – Cotton Wool Spots & Retinal Hemorrhages
<table>
<thead>
<tr>
<th>Substances Believed or Known to Cause Toxic Optic Neuropathy</th>
</tr>
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<tbody>
<tr>
<td>Amantadine hydrochloride</td>
</tr>
<tr>
<td>Amiodarone</td>
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<td>Amoproxan</td>
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<tr>
<td>Arsenicals</td>
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<td>Aspidium (male fern)</td>
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<td>Carbon disulfide</td>
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<td>Chlorodinitrobenzene</td>
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<td>Chlorpropamide</td>
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<td>Cyclosporine</td>
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<td>Desferrioxamine</td>
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Toxic Optic Neuropathy
Bilateral Disc Edema

Untreated will progress to optic atrophy with a pale disc
Toxic Optic Neuropathy

Loss of central vision

Dilation of Disc Capillaries and Retinal Hemorrhages on Fluorescein Angiogram
Hormones

• Levothyroxine (Synthroid)
  – Visual hallucinations
  – Eyelid retraction and dry eye if dose too high
  – Pseudotumor cerebri
  – Dry Eye
Hormones

- Oral Contraceptives
  - Dry eye and CL intolerance
  - Retinal artery and venous occlusion
  - More rare
    - Migraines
    - Pseudotumor cerebri
    - Macular edema
    - Transient ischemic attacks
Central Retinal Artery Occlusion that occurred in a 25-year-old female in whom the only known risk factor was oral contraceptive medication.
Hormones

• Estrogen Replacement
  – Steeping of corneal curvature
  – CL intolerance
  – Retinal thrombosis and optic neuritis reported with high doses
Hormones

• Steroids
  – This includes inhaled steroids for asthma & COPD
  – Cataracts
  – Glaucoma
  – Ptosis
Antihyperlipidemics

• Statins – e.g. Lovastatin, Atorvastatin, Simvastatin
  – May accelerate cataract formation
  – Dry eye
  – Blurred vision
  – New-onset diplopia, ptosis and ophthalmoplegia within eight months following statin administration (Fraunfelder 2008)

• Niacin (B3)
  – Dry eye
  – CME has been reported
Anticoagulants

• Warfarin, Heparin, Clopidogrel (Plavix)
  – Subconjunctival and retinal hemorrhage
Bisphosphonates

• Fosamax and others
  – Anterior Uveitis
  – Conjunctivitis
  – One study suggested an association with scleritis and retrobulbar neuritis
Urologic Drugs

• Tamsulosin (Flomax)
  – Floppy iris syndrome
  – Can occur irreversibly after only one dose
  – Cataract surgeon needs to know

• Erectile Dysfunction Drugs - sildenafil (Viagra), tadalafil (Cialis) and vardenafil (Levitra)
  – Blue Vision shift (sildenafil)
  – Evidence not clear if there is an association with blood flow changes or optic neuritis.
Anti-Infectives

- Sulfonamides and other Sulfa containing drugs
- Dorzolamide eye drops (Cosopt) Acetoazolamide (Diamox) and methazolamide (Neptazane)
  - Myopic shift
  - Rare – conjunctivitis and optic neuritis
Anti-Infectives

• Stevens-Johnson, Toxic epidermal necrolysis (ten)
  – Severe Dry Eye
  – Trichiasis
  – Symblepharon
  – Distichiasis
  – Entropion
  – Visual Loss
Anti-Infectives

• Minocycline and tetracycline
  – Minocycline - Hyperpigmentation including the periorbital area with prolonged use
  – Tetracycline has been associated with non-pupillary block angle-closure glaucoma
    • most likely due to an allergic response to the sulpha molecule
  – Pseudotumor cerebri
  – Rare - transient myopia, decreased vision, photophobia and diplopia.
Anti-Infectives

- Minocycline and tetracycline

Scleral hyperpigmentation from prolonged minocycline use
Anti-Infectives

- Chloroquine and hydroxychloroquine
- Anti-malarials also used in the treatment of rheumatoid arthritis and lupus
  - Keratopathy
  - Lens opacities
  - Ciliary body dysfunction
  - Optic nerve pallor
  - Retinal toxicity (bullseye maculopathy)
    - Usually dose > 6.5 mg/kg/day or cumulative 200g
  - Baseline exam, amsler grid, color vision, red desaturation, visual fields and fundus photography recommended
Anti-Infectives

- Chloroquine and hydroxychloroquine
- Toxicity less common with hydroxychloroquine sulfate (Plaquenil)

“Bulls-eye” maculopathy from Chloroquine
Anti-Infectives

- Ethambutol and Isoniazid
- Ethambutol more toxic and therefore less used
  - use increasing as multi-drug resistant TB is becoming more common world-wide
- Toxic optic neuropathy with loss of vision
- Color desaturation
- Visual field defects (central or cecocentral scotomas)
Dermatologic Drugs

• Minocycline used in treatment of acne
• Isoretinoin (Accutane)
  – Blepharoconjunctivitis
  – Dry eye (meibomian dysfunction and lipid layer deficiency)
  – Pseudotumor cerebri
  – Increased risk if concurrent minocycline
Analgesics and Anti-Inflammatory

• Topiramate (Topamax)
  – Acute angle closure glaucoma

• Ibuprofen (Advil, Motrin and others)
  – Dry eye
  – Blurred Vision
  – Visual Field Scotomata
  – Photophobia
  – Changes in color vision
Antihistamines

- Dry eye
- Weak atropine action, acting as cholinergic antagonists
  - mydriasis
  - anisocoria
  - decreased accommodation
  - blurred vision
Central Nervous System Agents

- Anti-depressants
  - Dry Eye
  - Blurred Vision
  - Photophobia
  - SSRI’s angle closure glaucoma
    - most common in first 6 months of treatment

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
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<tbody>
<tr>
<td>Citalopram</td>
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<tr>
<td>Escitalopram</td>
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<tr>
<td>Fluoxetine</td>
<td>Prozac</td>
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<tr>
<td>Fluvoxamine</td>
<td>Luvox</td>
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<tr>
<td>Sertraline</td>
<td>Zoloft</td>
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</tbody>
</table>
Central Nervous System Agents

- Thiorizine and chlorpromazine
  - Night blindness
  - “Browning” of vision
  - Blurred vision
  - Decreased accommodation
  - High doses (<500 mg per day) can lead to accelerated UV damage to retina with loss of vision and visual field defects
Central Nervous System Agents

• Gabapentin (Neurontin)
  – Double vision
  – Transient blurring

• Lithium
  – Dry eye and CL intolerance
  – Downbeat nystagmus
    • may not resolve after drug is stopped
  – Blurred vision due to cortical involvement can occur