Systemic Drugs Causing Eye Side Effects

Which Drugs Cause Ocular Side Effects?

Which Drugs Don’t........

- List of medications
- If you read drug inset information, almost all say “blurred vision”.

3/13/2017
PHOTOSENSITIZERS

- UV radiation can potentially affect the retina in aphakic and pseudophakic patients, because UV can penetrate without the normal absorptive lens barrier.

- Well-known photosensitizers that cause anterior subcapsular lens changes –
  - allopurinol,
  - phenothiazine,
  - amiodarone, and
  - chloroquine

Possible basis of ocular side effects of systemic drugs

1. Specific biochemical basis known:
   - Antimuscarinic drugs
     - Tamsulosin (alpha adrenergic blocker)
   - Sildenafil (block hyperpolarisation of photoreceptors)

2. Altered metabolism – increased drug concentration
   - Therapeutic window
   - Metabolism by liver/kidney – ethambutol toxicity in renal impairment; digoxin.
   - Different metabolism in young age
   - Possibility of drug transfer
   - Drug interaction

Possible basis of ocular side effects of systemic drugs

3. Predisposition to allergy in atopic individuals - Steven Johnson

4. Toxicity due to overdose
   - quinine
   - Chloroquine

5. Idiopathic & idiosyncratic – side effects even at correct dose
   - Diplopia - Glitazone, ethambutol, steroid, topiramate
   - Flomoxefione.
   - BH - vitamin A
   - Red tears - rifampicin in leprosy
**Most Common Drug Side Effects**

<table>
<thead>
<tr>
<th>PHOTORECEPTORS</th>
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</tr>
</thead>
<tbody>
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6. Recreational drugs
   Canthaxanthin - gold dust retinopathy
   LSD
   Ayahuasca tea (hallucinogen)

7. Adverse new side effects

Drugs Affecting Cornea

Vortex keratopathy / cornea verticillata:
characterized by whorl-like corneal epithelial deposits.

1. Signs:
   • Bilateral, fine greyish or golden-brown opacities in the inferior corneal epithelium.
   • Arborizing horizontal lines
Drugs Affecting Cornea

Causes:

a. Antimalarial
   Chloroquine (Nivaquine, Avloco)
   Hydroxychloroquine (Plaquenil)

INDICATIONS: malaria; certain rheumatological disorders
Unlike retinopathy, keratopathy bears no relationship to dosage or duration of treatment.
reversible on cessation of therapy.

Drugs Affecting Cornea

AMANTADINE:
INDICATIONS: Parkinson disease.

SIGNS:
Diffuse white punctate opacities that may be associated with epithelial edema. 1–2 weeks after commencement of therapy (dose 200–400 mg/d).
Resolve with discontinuation of treatment.

Drugs Affecting Lens

STEREIDS: cataractogenic; topical/systemic/nasal.
- lens opacities:
  PSC
  later the anterior subcapsular

relationship between weekly systemic dose, duration of administration, total dose and cataract formation is unclear.
patients on less than 10 mg prednisolone (or equivalent), or treated for less than 4 years may be immune.
Drugs Affecting Lens

Children are more susceptible to the cataractogenic effects of systemic steroids, and individual (genetic) susceptibility may also be of relevance. Early opacities may regress if therapy is discontinued; alternatively, progression may occur despite withdrawal and warrant surgical intervention. The etiology is unknown, the drug may react with amino groups of crystalline lens fibers causing protein complexes to aggregate.

Drugs causing uveitis

RIFABUTIN:

INDICATIONS: Tuberculosis in combination with other drugs in immunocompromised patients.

Drugs that inhibit metabolism of rifabutin through the cytochrome p-450 pathway (clarithromycin and fluconazole), increase the risk of uveitis.

SIGNS:

ACUTE ANTERIOR UVEITIS (AAU) U/L; assoc with hypopyon;

Treatment involves withdrawal of the drug or reduction of dose.

DRUGS AFFECTING OPTIC NERVE:

TOPIRAMATE

Signs include shallowing of the anterior chamber and raised intraocular pressure.

Treatment consists of reducing the intraocular pressure and stopping the drug.

Prognosis is usually good provided the complication is recognized.
DRUGS AFFECTING IOP

<table>
<thead>
<tr>
<th>INCREASE IN IOP</th>
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<tbody>
<tr>
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<td>Beta-blockers</td>
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<td>Cannabinoids</td>
</tr>
<tr>
<td>Phenothiazines</td>
<td>Cardiac glycosides</td>
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<td>TCA</td>
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RARE OCULAR SIDE EFFECTS

- Eyelid hyperemia:
  1. Levothyroxine.

- Ptosis:
  1. Barbiturate
  2. Chloroquine

- Visual field changes:
  1. Vigabatrin
  2. Paracentral scotoma:
     Chloroquine

- Pseudotumor cerebri:
  1. Amiodarone
  2. Levothyroxine
  3. OCPs
  4. NSAIDs
  5. Isotretinoin
  6. Tetracycline

Tamsulosin

- alpha-adrenergic blockers

- Indications:
  Benign prostate hyperplasia

- Ocular Side Effects:
  Loss of tone in iris dilator smooth muscle causing poor pupil dilation/prolapse during cataract surgery
  “Floppy Iris Syndrome”
Drugs causing uveitis

Cidofovir

INDICATION: CMV retinitis in AIDS patients.

SIGNS:
AAU: Vitritis is common and hypopyon may occur with long-term administration.

Treatment: topical steroids and mydriatics.

Drugs affecting retina

ANTIMALARIALS:
Chloroquine retinotoxicity: related to the total cumulative dose (>300g), Rx duration > 3y
Hydroxychloroquine: much safer than chloroquine

The risk of toxicity is increased if a daily dose over 6.5 mg/kg is administered for longer than 5 years, although even then the risk is still very small.

CHLOROQUINE RETINOPATHY

Chloroquine retinopathy can be divided into the following stages:

1. Premacularopathy

   normal visual acuity and a scotoma to a red target located between 4° and 9° from fixation.
   Amsler grid testing may also show a defect.
   Colour vision assessed: mild blue-yellow and protan red-green defects.
   (Adams Desaturation-15 test and the Hardy-Rand- Ritter test). If the drug is discontinued, visual function usually returns to normal.
2. Early maculopathy

- Modest reduction of visual acuity (6/9–6/12).
- Fundus examination: subtle ‘bull’s eye’ macular lesion (central foveolar island of pigment surrounded by a depigmented zone of RPE atrophy, which is itself encircled by a hyperpigmented ring).
- May progress even if the drug is stopped.

3. Moderate maculopathy

- Characterized by moderate reduction of visual acuity (6/18–6/24).
- Obvious ‘bull’s eye’ macular lesion.

4. Severe maculopathy

- Characterized by marked reduction of visual acuity (6/36–6/60).
- Widespread RPE atrophy surrounding the fovea.

Case Study
Thank You