1. Intraoperative floppy iris syndrome is most likely to be a side effect of which of the following drugs or supplements?
   (A) Tamsulosin
   (B) Sildenafil
   (C) Pamidronate
   (D) Canthaxanthin

2. Which of the following practices is not appropriate for the management of topiramate-associated acute narrow-angle glaucoma?
   (A) Discontinuation of topiramate treatment
   (B) Peripheral iridectomy
   (C) Peripheral iridectomy
   (D) Topical or systemic anti-glaucoma medications

3. Choose the correct statements about the ocular side effects of ethambutol.
   1. It can cause sight-threatening optic neuropathy in patients taking the starting dose of 15 mg/kg per day.
   2. The average time of onset of optic neuropathy is 235 days after starting ethambutol.
   3. At doses of 60 to 100 mg/kg per day, approximately 50% of patients develop optic neuropathy.
   4. Loss of central vision is an early sign of ethambutol-related optic neuropathy.
   5. Bitemporal scotomas are an early sign of ethambutol-related optic neuropathy.
   (A) 1, 2, 3, 4, 5
   (B) 1, 3, 4, 5
   (C) 2, 3, 4, 5
   (D) 1, 2, 4, 5

4. Choose the correct statement about the ocular side effects of hydroxychloroquine.
   (A) It causes retinopathy that is usually unilateral.
   (B) It can cause severe keratitis and corneal verticillata.
   (C) Retinopathy is most likely to occur during the first year of treatment.
   (D) None of the above.

5. Statins (3-hydroxy-3-methylglutaric acid reductase inhibitors) can cause total opthalmoplegia in some patients.
   (A) True
   (B) False

6. Among patients with primary acquired melanosis with atypia, the most common outcome is to continue to develop melanoma.
   (A) 35%
   (B) 45%
   (C) 51%
   (D) 55%

7. Choose the correct statements about the use of liquid nitrogen cryotherapy.
   1. Cryotherapy causes oesophageal stress in cells.
   2. The tumoricidal effect is optimized by maximizing the rates of freezing and thawing.
   3. Cryotherapy causes ice crystals to form within cells and rupture them.
   5. Cryotherapy causes programmed cell death over a period of weeks.
   (A) 1, 2, 3, 4, 5
   (B) 1, 3, 4, 5
   (C) 2, 3, 4, 5
   (D) 1, 2, 4, 5

8. If a cryoprobe is in contact with the eye for too long, freezing may extend deep into the endothelium.
   (A) 2 sec
   (B) 3 sec
   (C) 4 sec
   (D) 5 sec

9. Cryotherapy is not effective for the treatment of:
   (A) Pseudophakic bullous keratopathy
   (B) Conjunctival lymphangiectasia
   (C) Advancing wave-like epitheliopathy
   (D) Pedunculated papilloma of caruncle

10. Which of the following is (are) important in determining whether patients are good candidates for monovision correction?
    (A) Perform trial with monovision contact lenses for 2 weeks.
    (B) Determine the patient’s expectations for vision at all 3 focal lengths.
    (C) Rule out the presence of any underlying pathology or strabismus.
    (D) All of the above.

Educational Objectives
The goal of this program is to improve the practice of ophthalmology. After hearing and assimilating this program, the clinician will be better able to:
1. Identify and treat various ophthalmologic side effects associated with widely used drugs and herbal supplements.
2. Identify malignant and nonmalignant conditions that can be effectively treated with cryotherapy.
3. Optimize the application of cryotherapy in ophthalmologic practice.
4. Select appropriate candidates for monovision correction.
5. Educate patients about the benefits and limitations of monovision after refractive and cataract surgery.

Faculty Disclosure
In adherence to ACCME Standards for Commercial Support, Audio-Digest requires all faculty and members of the planning committee to disclose relevant financial relationships with the past 12 months that might create any potential conflicts of interest. For this program, the following has been disclosed: Dr. Fraunfelder has been a consultant for Eli Lilly, Dr. Forster, and the planning committee reported nothing to disclose.
greater risk for retinopathy), retinopathy rare at doses <6.5 mg/kg per day and duration of treatment <5 yr; patients taking HCQ >7 yr on higher doses, those with renal or liver disease, and those with a history of tendonitis (risk factor for tendonitis); average time to onset of tendonitis 9.6 days; 53 had positive dechallenge and 5 had positive rechallenge results; data indicate probable association; also causes allergic reactions and precipitates if used as eye drops, and worsens myasthenia gravis.

Statin: A 3-hydroxy-3-methylglutaryl-coenzyme A reductase inhibitors cause more severe diplopia in some patients; affects all striated muscles around eye (i.e., levator palpebrae superioris and all extraocular muscles); among 256 patients (average age, 64.5 yr), onset occurred 8.3 mo after starting statin, 23 had total ophthalmoplegia, 20 had diplopia, and 13 had piosis with double vision. 62 had positive challenge and 14 had positive rechallenge results; associate probable; statins most systemically (probably includes extracapillary and levator muscles); manage by discontinuing statin.

Hepatitis B vaccine: Select patients with cirrhotic (flushy, among 32 patients [average age, 29 yr], onset occurred 3 days after vaccination, 75% also had systemic illness; may cause hepatitis B reactivation, autoimmune disorders [eg, caused by multiple myeloma], and primary and secondary localized; likely caused by antigenic cross-reactivity; perform dechallenge after, cryotherapy applied to limbus with double vision; 62 had positive double vision and 14 had positive rechallenge results; data indicate probable association; also causes allergic reactions and precipitates if used as eye drops, and worsens myasthenia gravis.

Vascular tumors: cryotherapy useful for conjunctival or episcleral tumors, secondary systemic (eg, caused by multiple myeloma), and primary and secondary localized; likely caused by antigenic cross-reactivity; perform dechallenge after, cryotherapy applied to limbus with double vision; 62 had positive double vision and 14 had positive rechallenge results; data indicate probable association; also causes allergic reactions and precipitates if used as eye drops, and worsens myasthenia gravis.

Superior limbic keratoconjunctivitis: may occur due to mechanical rubbing of redundant conjunctiva; associated with thyroid eye disease; shows fine papillary reaction on palpebral conjunctiva of upper lid; benefit of freezing probably due to tacking down of conjunctiva to underlying sclera (ie, no longer redundant); speaker freezes superior conjunctiva only (<20° into cornea) by holding probe on eye 2–2 sec (no freezing occurs deep within endothelium or in choroid and retina unless held 5–6 sec).

Conjunctival sarcoidosis: mark sacroid nodules with sterile ink at slit lamp, then perform cryotherapy at mark; white Blanching desired; keep eye open to avoid warming too quickly (slow thaw possibly more important than rapid freeze).

Pterygia: excise conjunctiva away from rectus muscles and bring up to limbus; t-t 4-0 silk around base and pull rapidly; after evulsion, cryotherapy applied to limbus with double vision; 62 had positive challenge and 14 had positive rechallenge results; associate probable; statins most systemically (probably includes extracapillary and levator muscles); manage by discontinuing statin.

Suggested Reading

Dr. Fraunfelder spoke at 32nd Annual Meeting—Where Utah Ophthalmology Meets, held February 25, 2011, in Salt Lake City, UT, and sponsored by the Utah Ophthalmology Society (to attend the 32nd Annual Meeting of the Utah Ophthalmology Society, visit www.utaheye.eds.org). Dr. Forster addressed Cataract and Refractive Surgery Congress, held February 26, 2011, in Miami, FL, presented by the Bascom Palmer Eye Institute, and sponsored by the University of Miami Miller School of Medicine (to attend the Bascom Palmer Eye Institute’s Cataract and Refractive Surgery Congress, visit www.bascompalmer.com). The Audio-Digest Foundation thanks the speakers and the sponsors for their cooperation in the production of this program.
greater risk for retinopathy), retinopathy rare at doses <0.5 mg/kg per day for <5 yr, occurs in <5 yr of age every 2-3 yr, 4-8 yr, for cases of increasing vision loss; a significant risk of visual field loss if caught early (while scotoma is relative); patients with macular degeneration may be predisposed to side effects of HCQ, but explain risks and document informed consent.

Fluorouracil: causes drug to many patients; myocytic toxicity in stratified muscle main systemic side effect. Speaker hypothesizes that extracellular muscles also develop toxicity. Among patients with no previous experience with monovision—plan for monovision correction; patients with symmetrical cataracts—ie, patient with cataract in each eye and a range of visual acuities, patients could be placed into categories of near distance, intermediate distance, and far distance; no exercises, take care to do equal exercises.

Mechanism: small blood vessels; cell crystal formation within cells, which causes them to rupture; denature lipoprotein, leading to lipid aggregation within cells, leading to cell death. The mechanism of cell death is not known. Patients with known monovision lenses use monovision to correct distance; some patients use monovision to correct near distance and far distance; consider operating on distance for first eye and distance for second eye; patients with monovision consider operating on distance for first distance and operating for monovision for second eye (ie, 0.75 to 1.25 D with 0.25 D of distance between eyes), speculating that 1.25 D in first eye, if patient functions well at distance (ie, >20/20), then corrects using 0.75 to 1.25 D for second eye, which enables patients to read at 12.

Suggested Reading

Dr. Fraunfelder spoke at the 3rd Annual Meeting—Where It’s At—Critical Updates on Ophthalmology, held February 25, 2011, in Salt Lake City, UT, and sponsored by the Utah Ophthalmology Society (to attend the 3rd Annual Meeting of the Utah Ophthalmology Society, visit www.utaheyeemds.org). Dr. Forster addressed Cataract and Refractive Surgery Congress, held February 26, 2011, in Miami, FL, presented by the Bascom Palmer Eye Institute, and sponsored by the University of Miami Miller School of Medicine (to attend the Bascom Palmer Eye Institute’s Cataract and Refractive Surgery Congress, visit www.bascompalmer.org). The Audio-Digest Foundation thanks the speakers and the sponsors for their cooperation in the production of this program.

Acknowledgements

The Audio-Digest Foundation designates this enduring material as Category 1 credit for physicians. The American Academy of Ophthalmology designates this program for 1.0 CE Credit. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour.

The California State Board of Registered Nursing (CA BRN) approves courses provided for AMa C category 1 credit as meeting the continuing education requirements for licensed practical nurses (LPN). The Joint Commission on Allied Health Personnel in Ophthalmology (JCAHO) allows certificates to earn JCAHO Group B credit for educational activities. Each program is approved, and each program is approved for 2 CEUs. The Joint Commission on Allied Health Personnel in Ophthalmology (JCAHO) designates this program for 1 CME Group A credit. Each program is approved for 2 CEUs for the Jack R. Fraunfelder, MD, financier of Ophthalmology. The Audio-Digest Foundation designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology designates this program for 1 CE Contact Hour. The American Academy of Ophthalmology...
1. Intraocular floppy iris syndrome is most likely to be a side effect of which of the following drugs or supplements?

(A) Tamsulosin (B) Sildenafil (C) Pamidronate (D) Canthaxanthin

2. Which of the following practices is not appropriate for the management of topramate-associated acute narrows-angle glaucoma?

(A) Discontinuation of topramate treatment
(B) Peribulbar inopholy
(C) Peribulbar iridectomy
(D) Topical or systemic antiglaucoma medications

3. Choose the correct statements about the ocular side effects of ethambutol.

(A) It can cause central scotomas and bitemporal scotomas
(B) Peripheral iridoplasty can be effective in treating posterior uveitis
(C) Retinopathy is most likely to develop during the first year of treatment
(D) None of the above

4. The average time of onset of optic neuropathy is 235 days after starting ethambutol.

5. The mechanism of ethambutol-related optic neuropathy is thought to be due to an autonomic neuritis. The drug is also associated with retinopathy and optic atrophy.

6. Among patients with primary acquired melanosis with atypia, 15% go on to develop melanoma.

7. Cytotoxic chemotherapy can cause osseous stress in cells.

8. The tumoricidal effect is optimized by maximizing the rates of freezing and thawing.

9. Cytotoxic chemotherapy denatures the lipid-protein complexes of cell walls.

10. Cytotoxic chemotherapy can cause programmed cell death over a period of 26 wk.

11. Cryotherapy is not effective for the treatment of:

(A) Pseudophakic bullous keratopathy
(B) Conjunctival lymphangiectasia
(C) Advancing wave-like epitheliopathy
(D) Pedunculated papilloma of caruncle

12. Which of the following is(are) important in determining whether patients are good candidates for monovision correction?

(A) Perform trial with monovision contact lenses for 1 wk
(B) Determine the patient’s expectations for vision at all 3 focal lengths
(C) Rule out the presence of any underlying pathology or strabismus
(D) All the above

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Drug-Related Adverse Effects of Clinical Importance to the Ophthalmologist

Rick W. Fraunfelder, MD, Associate Professor of Ophthal-mology, Casey Eye Institute, Oregon Health and Sci-ence University, Portland

World Health Organization (WHO) classification system: classifies adverse drug reactions as certain, probable, possible, or unlikely — temporal pattern or dose response and posi-tive rechallenge data (rarely available); probable — temporal and dose response patterns but no rechallenge data; possible — side effect possibly explained by other diseases or drugs.

Tamsulosin (tamsulosin): used for benign prostatic hypertrophy; also α-adrenergic antagonist used for control of blood pressure; class appears to cause intraocular floppy iris syndrome (presence of flaccid iris stroma, iris transillumination, e.g., of paracentral or cataract wound, and pupil that becomes progressively more mi-only during surgery); management — patient may insert pupil expansion rings or iris hooks, or use fortified balanced salt solution (e.g., BSS Plus) with lidocaine and epinephrine; discontinuing tamsulosin not effective because iris dilator muscle atrophied perma-nently after o<3 mo, refers cases of zonular dialysis.

Topiramate: used for epilepsy, migraine headaches, depression, schizoaffective, and weight loss; side effects include problems with memory, paresthesias in extremities, and topiramate-as sociated acute narrows-angle glaucoma (ANAG); ANAG occurs 3 days to 3 wk after starting topiramate; patients in case series 3.5 to 53 yr of age, mostly women, with bilateral ANAG.

Mechanism: ultrasound shows suprachoroidal effusions, lens-iris diaphragm pushed forward, and 28% D of myopia induced; peripheral iridoplasty is ineffective in resolution of closure angle rather than pupil block.

Management: peripheral iridoplasty not effective; peripheral inopholy flattens iris and opens trabecular meshwork; discontinue topiramate and use topical or systemic antiglaucoma medications.

Bisphosphonates: used for osteolytic bone metastases, multiple myeloma, and Paget disease, and to prevent postmenopausal calcium bone loss, bisphosphonate ERO for scleritis (vision-threatening condition), occurs 6 to 48 hr after intravenous injection, developed unlaterally in 17 patients in case se ries, on rechallenge, positive results seen in 6 cases; scleritis did not resolve unless drug discontinued.

Eye inflammation: pannidimetria causes conjunctivitis, episcleritis, as well as most cases of scleritis; all bisphosphonates found to cause eye inflammation and scleritis; pa tients experiencing decreased vision or eye pain should see ophthalmologist.

Management: conditions that do not require discontinuation of medication include nonproliferative conjunctivitis (treat with at-tificial tears or nonsteroidal anti-inflammatory drugs),uve-ritis (treat with topical steroid drops), and episcleritis; scleritis fully reversible and requires discontinuation of drug.

Ethyambutol: causes optic neuropathy in some patients; used for multidrug-resistant tuberculosis; review of 55 case reports showed average dose of 15 mg/kg per day (i.e., starting dose for drug-naive patients); average time of onset 235 days; 50% of patients have optic neuropathy at doses of 60 to 100 mg/kg per day; early signs include loss of central vision, color loss (blue-yellow or red-green), central scotomas, and bitemporal scotomas.

Informed consent: speaker recommends ophthalmologists ob tain informed consent from patients who take ethambutol (sample form available upon request). Aims to increase familiarity with tests of visual acuity (VA); see patients every month.

Dietary guidelines for patients including ED drugs: if they have history of central se owing chororetinopathy, nonarteritic ischemic neuropathy, episodes of transitory visual loss, or retinovascular disease.

Drugs for erectile dysfunction (ED): frequent use associated with blue vision, perception of shimmering around bright objects, conjunctivitis, and subconjunctival hemorrhages; speaker cautions against using ED drugs.

Herbal medications and supplements: can cause clinical retinopathy and changes in electroretinography (ERG), but not visual loss; patients with arthritis or atopic dermatitis may have severe allergic reactions to chamomile tea placed on eyelids for conjunctivitis; Danu a causes mydriasis and angle-closure glaucoma, extracts of Echinacea can cause irritative conjunctivitis; gingo biloba extract can cause hyphema and hemorrhages, licorice (black bitter type) can cause migraine headaches; niacin causes nonleaking cystoid macular edema, dry eyes, and discoloration around eyelids; large doses of vitamin A known to cause pseudotumor cerebri.

Hydroxychloroquine (HCQ): American Academy of Ophthalmology to release updated position paper; may recommend additional treatment if patient had exposed eye; use of HCQ for retinopathy caused by HCQ; retinopathy rare; occurs bilaterally; reproduced rat study confirming retinopathy; if unilateral, probably not related to HCQ; baseline exami nation should include testing of VF (e.g., Humphrey VF 10-2; and VA, and dilated fundus examination; speaker cautions informed consent important for this drug; causes vortex keratopathy and cornea verticillata (does not indicate...