

Eye Care Newsletter

Omni Eye Specialists • Madison Street Surgery Center
Spivack Vision Center

Special points of interest:

- Ocular Side Effects of Systemic Medications
- Technology Crossover
- Corneal Collagen

Systemic Medications and Ocular Side Effects

Vandi Rimer, OD

When prescribing systemic medications keep in mind that there can be ocular side effects. Below, I have listed multiple medications and drug classes that are commonly prescribed.

Systemic Hypertension Medications:

Beta Blockers: atenolol, propranolol, metoprolol- The primary ocular side effect with using this medication is dry eye with complaints of gritty eyes, irritation, foreign-body sensation and photophobia. These symptoms are due to a reduced tear production and dry eye syndrome. If patients have these complaints advise the patient to use artificial tears more frequently and/or consider prescribing Restasis, a medicated eye drop for dry eye treatment.

Alpha Adrenergic Receptor Blockers: Dixarit (clonidine) – side effects of ocular burning and pupillary miosis.

ACE-inhibitors- Captopril, Vasotec, Altace, Accupril.- the more common side effects for these medications is decreased vision, photosensitivity, conjunctivitis, lid edema and discoloration and blepharitis.

Cholesterol Control

Statins: Lipitor, Lescol, Mevacor, Crestor, Zocor,

Niacin - Lipitor – associated with increased intraocular pressure, dry eye, and ocular hemorrhages
Mevacor and Zocor – No

ocular side effects!

Niacin – has been associated with toxic amblyopia and cystoid macular edema, also facial and eyelid flushing within a few hours of ingestion.

Cardiac and Vascular Drugs Anti-Angina

Medications: Nitroglycerin or Nitro-BID- side effects are decreased vision and colorful halos, variations in intraocular pressure, pseudotumor cerebri,

Cardizam- ocular side effects are photosensitivity, hallucinations, amblyopia, periorbital edema, lacrimation, subconjunctival and retinal hemorrhages.

Pulmonary Disease Drugs Beta-2 adrenergic agonists, anticholinergics and theophylline derivatives.

Albuterol can cause reduced vision, dilated pupils, conjunctivitis (due to blood vessel dilation) and petechial conjunctival hemorrhages.

Steroid- inhalers have been linked to posterior and sub capsular cataracts, delayed corneal healing, increased intraocular pressure and exacerbation of glaucoma in susceptible individuals. Steroids may also cause mydriasis.

Mast Cell Stabilizers – inhaler Tilade has been associated with conjunctivitis. Cromlyn sodium, has no reported ocular side effects.

TB medications – Myambutol, Rifadin, Nydrasid, which has been associated with

complaints of transient and reversible accommodation impairment and optic neuropathy. Myambutol may cause significant visual side effects, within one month of starting therapy including color vision changes in the red-green color spectrum, visual field defects, decreased acuity and central scotomas.

Seasonal Allergy medications – Claritin has been associated with conjunctivitis and decreased lacrimation (leading to dry eyes) with blurred vision and pain. Zyrtec has been reported to cause dry eyes, contact lens intolerance, and in a few cases, loss of accommodation in pre-presbyopes. Regular use of artificial tears can help to minimize dry eye symptoms.

Rheumatological Drugs

NSAIDS – visual affects include vision changes, scotoma, photophobia, diplopia, color vision changes and rarely toxic optic neuropathy. Adverse ocular reactions include vernal keratoconjunctivitis, pseudotumor cerebri, optic neuritis and macular edema.

Indocin- visual side effects include double vision and blurred vision. Ocular side effects include corneal toxicity, optic neuritis, photosensitization with an adverse affect on the macula. These patients should be advised to wear UV protective sunglasses.

Fosamax and Actonel have been associated with visual changes, photophobia and ocular pain. Significant adverse reactions include increased lacrimation, hyperemia, anterior uveitis, episcleritis and peri-orbital lid edema.

Anti-Malaria medications –

Chloroquine and Plaquinel have visual side effects of decreased accommodation, corneal whorls and scotomas. Ocular side effects include a “bull’s-eye” maculopathy with attenuated retinal vessels. Patients may have a yellow, green or blue tinge to their visual field with colored halos around lights. It is important for all patients on this medication to get a baseline visual field and fundus examination with routine follow ups.

Genitourinary Medications

Hormone Replacement Therapy (HRT) Estrogen- Ocular adverse reactions include retinal vascular thrombosis, dry eye and pseudotumor cerebri has been reported.

Progesterone has been associated with abnormal vision, diplopia and visual disturbance. Hormone receptor sites are located on meibomian glands, physiological changes can cause alterations in the tear film, causing dry eye and contact lens intolerance – which are fairly common side effects of this medication. Again, artificial tears can be helpful in reducing the dry eye symptoms.

Prostate therapy – Lupron (prostate cancer medication) has ocular side effects of temporary blurred vision for several hours up to three weeks after administration of medication. Also known to cause pseudotumor cerebri.

Flomax – the most critical ocular

side effect of this medication is known as Intraoperative Floppy Iris Syndrome (IFIS). This can cause complications to occur during cataract surgery. It is important for the patient to inform their eye surgeon that they are on this medication prior to cataract surgery, to allow the surgeon to take additional measures during surgery including using iris hooks, iris dilator rings or viscoelastic substances to help keep the iris from intra operative miosis or iris prolapsing into the phacoemulsification incisions.

Erectile Dysfunction – Viagra can cause a bluish tinge to objects, blurred vision and hypersensitivity to light. These symptoms last a few minutes to several hours and are reversible. There have been a few cases of anterior ischemic optic neuropathy and non-arteritic ischemic optic neuropathy which can cause permanent vision loss.

Cialis has rarely been associated with color vision changes, however blurred vision, conjunctivitis with hyperemia and eye pain and decreased lacrimation have been associated with Cialis use.

Psychogenic Medications

Depression – Prozac- most common ocular side effect is blurred vision (3% in all cases). Other side effects include pupil dilation, keratitis sicca (dry eye) diplopia and ptosis.

Zoloft- patients may experience reduced accommodation, abnormal extraocular muscle motility patterns leading to diplopia.

Panic Disorder – Xanax – these patients suffer from similar side effects to Zoloft and prozac with reduced accommodation, double vision, dry eyes

and conjunctivitis.

Schizophrenia – Thorazine can cause the deposition of particulate matter in the cornea yielding epithelial keratopathy. These particulates can also deposit in the lens causing star shaped cataracts in the anterior lens cortex resulting in visual impairment. Pigmentary retinopathy has also been reported. Thorazine use can also cause both miosis and mydriasis. All side effects may be reversible when the medication is discontinued. Patients on this medication should have yearly eye exams.

Obsessive Compulsive Disorder (OCD)- Anafranil has been associated with ocular motor paralysis, nystagmus, abnormal vision, mydriasis, conjunctivitis, anisocoria and blepharospasm.

Zoloft- visual side effects include accommodation problems, eye pain and conjunctivitis.

Many systemic drugs produce significant visual and ocular side effects. Some are minimal while others are extremely severe. In many cases, the systemic benefits of the medication outweigh the ocular side effects, but in other cases the ocular side effects can cause permanent or severe compromise to the vision or ocular structures. It is important to recognize these side effects and if necessary refer the patient to an eyecare provider for a comprehensive ocular examination.

The information in this article was obtained from an article written by Bruce G. Muchnick, OD in Review of Optometry January 15, 2008 p60-70.

Technology Crossover

G. Pardos, M.D.

Lasik, the laser correction of refractive errors in the eye, has evolved over the last thirteen years. The most recent innovation in Lasik is the use of the femtosecond laser. This laser allows for the creation of precise linear incisions in the vertical or horizontal plane. The femtosecond laser has replaced the traditional microkeratome as the instrument that produced the flap and resultant corneal bed which was subsequently contoured with the excimer laser.

While the mechanical microkeratome was an excellent device in its time, it has several drawbacks. The predicted thickness of the flap created and therefore the depth of the bed was inaccurate. The mechanical nature of the microkeratome also created a certain percentage of incomplete flaps.

The femtosecond laser has allows the surgeon to accurately create the depth of the cut and therefore the flap thickness and eliminated the mechanically caused complications associated with the microkeratome. Now with the newly introduced femtosecond iFS laser (of which Spivack Vision Center is the first and only center in metro Denver to own) the edge of the flap can be beveled to the surgeon’s preference, creating greater flap stability. The size and shape of the flap can also be easily manipulated to more closely match the Lasik ablation.

While the femtosecond laser was introduced as a major improvement in Lasik, the technology is now being used in other ophthalmic surgeries. Where before, a corneal transplant used a metal circular blade to produce the recipient bed and the donor cornea button, the femtosecond laser can now create a perfectly matched recipient bed and donor button. Because of the more exact physical relationship between the donor button and the host bed, the amount of astigmatism created by the procedure is minimized. With the femtosecond iFS, the potential for beveling the edge of both the bed and donor corneal button, it can create a more stable and securely positioned corneal transplant. This in turn can allow earlier suture removal and visual rehabilitation.

Recently the femtosecond laser is being investigated for cataract surgery. Relaxing incisions are currently made with a scalpel. The purpose of which is to reduce post operative astigmatism. However the depth and length of these incisions is totally dependent on the surgeon's skill, which in turn leads to a greater variability in the result. The femtosecond laser, with its ability to create precisely placed incisions with controlled depth lends itself as the perfect instrument for the creation of relaxing incisions with far better predicted outcomes. It is also being investigated in creating the capsulotomy, the opening in the cataract's capsule that is made prior to using phacoemulsification. Because this step is surgeon controlled, trying to create a circular opening in the capsule with a forceps, can lead to an opening that is too large, too small or torn and not circular. Any of these results can make the balance of the procedure technically much more demanding. The precise nature of the femtosecond laser's ability to make an incision, allows the surgeon to control the size and shape of the capsulotomy and eliminate a major source of possible complications. In very dense cataracts, the time to emulsify the lens can be lengthy and fraught with complications. The femtosecond laser is being investigated for its ability to break up the dense cataract into smaller pieces allowing the subsequent emulsification to be less time and energy consuming and therefore safer.

The technical advancements in Lasik are now providing surgeons with safer surgical techniques for other unrelated ophthalmic procedures such as cataract surgery.

Corneal Collagen Cross-Linking

George J Pardos, M.D.

In the past, when a patient developed keratoconus, a progressive steepening and thinning of the cornea, the patient would be fitted with a contact lens in order to attain adequate visual acuity. As the disease progressed, specialty contact lenses would be fitted. If the patient's corneal steepening was such that the specialty contacts no longer worked, or the wear time was significantly shortened or corneal abrasions were the norm, the only other alternative was a corneal transplant.

There is now a real possibility that the need for a corneal transplant in such patients may be delayed if not eliminated in the not too distant future. In the late 1990's Dr. Theo Siler and Eberhard Spoerl, PhD, both in Germany, developed a collagen cross linking procedure to address the underlying pathology of keratoconus. After debriding the corneal epithelium, riboflavin is

instilled on to the cornea over 30 minutes while irradiated with UV light. A bandage contact lens, anti-inflammatory drops and antibiotics are placed over the cornea until the epithelium grows back.

The results of a recent US, multi-center study, have been very encouraging. The cornea has been found to stabilize, that is no longer steepening by three months and by six months has become flatter. The flattening has been 6 diopters or more. The cross linking, by compacting the corneal stroma, not only flattens the cornea, but also makes the cornea thinner than pre-operative. While the later is not necessarily a positive outcome, the strength of the corneal tissue as a result of the cross linking of collagen fibers, has made it a stronger cornea, albeit, thinner than before. While still investigational, a patient currently with corneal steepness of 60 diopters (very steep) or with a corneal thickness of less

than about 400 nm would not qualify for the procedure. Those with very steep corneas have not significantly benefited. The first 370 nm of cornea absorbs the UV radiation. If a patient's cornea approaches that number the risk of UV radiation to the retina raises significantly.

Assuming these early results *are* repeatable and the procedure is found to be ultimately safe other applications can be found for the use of collagen cross linking. Recalcitrant corneal ulcers would benefit from collagen cross linking. Post refractive patients who developed a rare form of corneal ectasia would also be beneficiaries of the procedure. Assuming the US experience reflects the European experience, and this procedure is approved here, it's use in early cases of keratoconus could conceivably make corneal transplants for such patients a treatment of the past.

We are on the Web!
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