Centre for Eye Health

CHAIR-SIDE REFERENCE: SCREENING OCULAR TOXICITY OF SELECTED DRUGS

Many systemic drugs have ocular side effects, some of which are potentially sight threatening. It is important to monitor and screen patients on these drugs as early detection and reporting to appropriate medical practitioners may be critical in preventing irreversible vision loss. This chairside reference describes the major potential ocular side effects related to selected systemic drugs, in particular those that with RPE/retinal implications. Non-vision threatening toxicity such as vortex keratopathy from amiodarone is outside the scope of this reference.
This reference provides recommendations on the workup and ongoing follow-up intervals in an optometric setting. It is not intended to cover the spectrum of all ocular side effects of systemic drugs (e.g. drugs that induce mydriasis, dry eyes, and steroids), nor is it designed to provide guidance on intervention or treatment.

Drug name	Use	Potential sight threatening complication	Onset^	Signs & symptoms	Clinical examination recommendation					Screening recommendation
					CV	VF*	CFP	OCT	FAF	
Amiodarone (Cordarone)	Anti-Arrhythmia	Optic neuropathy	Months	Insidious visual loss (mostly bilateral), colour vision abnormalities, variable field defect, disc oedema.	•	• 30-2	•	•		Baseline evaluation before treatment, every 4, 8 and 12 months after treatment initiation, yearly thereafter or on an as-needed basis depending on clinical findings.
Fingolimod (Gilenya)	Anti-multiple sclerosis	Macular oedema	Months	Blurred vision, reduced VA, metamorphosis, increased macular thickness, hypo-reflective cystic spaces in the macula		• Amsler	•	•		Baseline evaluation before treatment, **3-4 months** after treatment initiation. Advise patient to use Amsler grid self-monitoring. Patients with diabetes and uveitis are at a higher risk and may need to be screened more closely. Patients who undergo intraocular surgery also need pre and post-operative assessment.
Chloroquine (Nivaquine, Avlocor), Hydroxychloroquine (Plaquenil)	Anti-malarial, Anti-rheumatologic	Bull's eye maculopathy	Years	Paracentral scotoma, nyctalopia, focal thinning of photoreceptors (early), vision loss and Bull's eye maculopathy (late).		• 10-2 (non-Asian), 30-2 (Asian)	•	•	•	Baseline evaluation within the first year and **yearly** screenings begins **after 5 years**, sooner if risk factors (high dosage HCQ>5.0mg/kg real weight, CQ>2.3mg/kg real weight, long duration>5 years, renal disease, tamoxifen use, concomitant macula disease) are present.
Tamoxifen (Nolvadex)	Anti-neoplastic	Crystalline maculopathy, macular oedema	>1 year	Often asymptomatic. Bilateral fine deposits in perifoveal region, foveolar cyst, Visual acuity loss if macula oedema or haemorrhages present.	•		•	•		Baseline evaluation within first year and then **3-6 monthly** if symptomatic. No continued screening is required if there is absence of signs and symptoms.
Interferon-alfa (Intron, Rebetron)	Anti-neoplastic	Ischaemic retinopathy Optic neuropathy	Months	Often asymptomatic, intraretinal haemorrhages and/or cotton wool spots (CWS).			•	•		Baseline evaluation before treatment and **3 monthly** assessments thereafter.
Vigabatrin (Sabril)	Anti-epileptic	Irreversible field restriction	Months to years	Normal VA, bilateral, concentric or bi-nasal visual field defects, fundus is typically normal. May have disc pallor, arteriolar narrowing and/or abnormal macular reflexes.		• HVA full field screening or kinetic perimetry		•		Initial visual field screening before treatment then every **6 months** for **5 years. Yearly** thereafter if no defects are present. If a visual field defect is noted, repeat within one month to confirm. Use threshold 30-2 to monitor progression. Electrophysiology is indicated if field testing is not viable.

^ Onset may vary depending on dose and duration.
* In addition to comprehensive dilated fundus examination.
# Visual field test program and pattern outlined are based on Humphrey Visual Field Analyser (HVFA), equivalent tests are available in other perimeters.
Key: CV: colour vision; VF: visual field; CFP: colour fundus photograph; FAF: fundus autofluorescence; UBM: ultrasound biomicroscopy

Centre for Eye Health

CHAIR-SIDE REFERENCE: SCREENING OCULAR TOXICITY OF SELECTED DRUGS

Drug name	Use	Potential sight threatening complication	Onset^	Signs & symptoms	Clinical examination recommendation					Screening recommendation
					CV	VF*	CFP	OCT	FAF	
Topiramate (Topamax)	Anti-epileptic Migraine	Angle closure glaucoma	Weeks	Blurred vision, ocular and/or periorbital pain, headache, increased IOP, myopic shift, angle closure, cilio-choroidal effusion.	Gonio/ UBM					Baseline evaluation should include gonioscopy. Routine review is not recommended. Warn patients of side effects and symptoms and to seek urgent attention if they occur.
Thioridazine (Aldazine) Chlorpromazine (Thorazine)	Antipsychotic	Pigmentary retinopathy	Months	Slightly reduced VA, nyctalopia, dyschromatopis, Salt-and-pepper pigmentary disturbance in mid-periphery and posterior pole, focal or diffuse loss of RPE and choriocapillaris.	•		•	•	•	Baseline evaluation followed by **yearly** review or sooner for high dose (>600mg per day)
Ethambutol (Myambutol)	Anti-tubercular	Optic neuropathy	Months	Sudden vision loss, colour vision abnormalities, central scotoma, normal or slightly swollen optic nerve.	•	• 30-2	•	•		Baseline evaluation before treatment, followed by every **4 weeks** if daily dose>15mg/kg, every **3-6 months** for lower dose
Canthaxanthin	Anti-psoriasis Vetiligo	Crystalline maculopathy	Dose dependent	Often asymptomatic, refractile, yellow intraretinal deposits form a ring-like pattern in perifoveal region.			•	•		Baseline evaluation followed by **yearly** review, 6 monthly for those with pre-disposing factors such as retinal vein occlusion, RPE disruption, and central serous chorioretinopathy
Deferoxamine (Desferal, Desferrioxamine, deferasirox)	Iron chelator for transfusional haemosiderosis	Pigmentary retinopathy, optic neuropathy	Months	Decreased vision, nyctalopia, dyschromatopisa, field loss, multiple discrete hypo-and hyperpigmented lesions at posterior pole and mid-peripheral retina.	•	•	•	•	•	Baseline evaluation followed by screening at **6-monthly** intervals.
Filler for intravenous narcotics	Talcum powder	Macular/retinal ischaemia; crystalline maculopathy	Unknown	Decreased vision, scotoma, bilateral hyper-reflective intraretinal small yellow deposits in macula, arterial occlusion, CWS, AV anastomosis, neovascularisation of the disc or in the periphery.			•	•		Baseline evaluation for current and past IV drug users For active IV drug users, monitor routinely for emboli and their ischemic sequelae

^ Onset may vary depending on dose and duration.
* In addition to comprehensive dilated fundus examination.
# Visual field test program and pattern outlined are based on Humphrey Visual Field Analyser (HVFA), equivalent tests are available in other perimeters.
Key: CV: colour vision; VF: visual field; CFP: colour fundus photograph; FAF: fundus autofluorescence; UBM: ultrasound biomicroscopy