GLAUCOMA: TOPICAL OPHTHALMICS FOR POAG: Comparison Chart [1,2,3,4,5,6]

Prepared by C.Anderson,B. Jensen BSP **www.RxFiles.ca** **Sept 04**

Generic TRADE Name (Dosage forms)	Dose / Frequency	Cost / 30day	Comments *remove contact lenses prior to instilling any eyedrops *occlude the lacrimal punctae for at least 1min after instillation or shut eyes tightly * all suspensions must be shaken prior to use *wait at least 5 minutes between consecutive drops *allergies to preservatives possible
β-Blockers: ↓ aqueous production/secretion via sympathetic receptor blockade in the ciliary body *(~20-40% ↓in IOP)*			**β**-blockers are usually the **first line** of therapy for POAG **if no CI exists** (asthma, COPD, bradycardia, heart block, overt CHF, cardiogenic shock) **Systemic side effects (up to 10% incidence)**: ↓HR, ↓BP, CHF, cold extremities, bronchospasm, ↓ symptoms of hypoglycemia, ↓ libido, itchy red skin, alopecia, CNS SE's (H/A, depression, fatigue, weakness etc.), tolerance to IOP ↓'ing effect may occur with prolonged therapy -systemic side effects are more likely to occur with timolol & levobunolol (non-selective β1β2 antagonism) vs betaxolol (β1-selective) **Topical side effects**: **(up to 10% incidence)** stinging, dry eyes, foreign body sensation, photophobia, blurred vision, ↓ visual acuity, eyelash crusting -allergic reaction has been reported (no cross-reactivity between agents, therefore may switch within the class) **Drug interactions**: caution with other drugs that ↓ HR/BP
Betaxolol			
BETOPTIC S 0.25% susp	1 gtt q12h	$34 (10ml)	
Levobunolol			
BETAGAN 0.25, **0.5**% soln	1 gt q12-**24**h	$26 (5,10ml)	
Timolol			
TIMOPTIC **0.25**,0.5% soln	1 gtt q**12**-24h	$25 (10ml)	
TIMOPTIC XE **0.25**,0.5%gelsoln	1 gtt q24h	$26 (5ml)	
α/β agonist: ↑ outflow via trabecular meshwork and ↓ production of aqueous humour *(~20-25% ↓IOP)*			Note: Brimonidine may also ↑ uveoscleral outflow Dipivefrin is a prodrug of epinephrine therefore ↑ potency & ↑ tolerability vs. epinephrine ophthalmic drops Apraclonidine for perioperative control of IOP (1%) and as short-term adjunctive therapy in POAG (0.5%) (2nd-3rd line tx) -may not provide ↑ benefit when given with **β**-blockers or carbonic anhydrase inhibitors because they have common MOA's -usually only short-term therapy b/c tachyphylaxis develops (apraclonidine>brimonidine) and topical side effects **Systemic side effects**: **(up to 10% incidence)** dry mouth/nose, arrhythmias, H/A, ↓ HR, anxiety, sleep disturbances,↓ BP, lethargy, fatigue, drowsiness -CNS SE's more common with brimonidine (>10%) (vs. apraclonidine) due to ↑'d lipophilicity **Topical side efects:** **(up to 10% incidence)** burning/stinging, photophobia, blurred vision, mydriasis (dipivefrin), blanching , eyelid elevation. Allergic reaction with apraclonidine (incidence as high as 50%): hyperemia, pruritis, discomfort, edema & ++tearing. May be better tolerated with Alphagan P. **Drug interactions:** ↑ effect of CNS depressants (eg. alcohol, benzodiazepines, etc.), MAOI's contraindicated with apraclonidine, other drugs that ↓BP
Dipivefrin			
PROPINE 0.1% soln	1 gtt q12h	$19 (10ml)	
α2 agonists: ↓ aqueous production via local α2 agonist action *(~18-27% ↓IOP)*			
Apraclonidine			
IOPIDINE **0.5**%; 1% soln⊗	1 gtt q**8**-12h	$32 (5ml)	
Brimonidine			
ALPHAGAN / PMS 0.2% soln	1 gtt q8-12h	$35 (10ml)	
ALPHAGAN P ☎✆0.15%soln	1 gtt q8-12h	$46	
PNS agents: (Direct and Indirect) ↑ outflow via trabecular meshwork *(~20-30% ↓IOP)*			Pilocarpine has similar efficacy to β-blockers in terms of IOP reduction but not as well tolerated (2nd line tx) -2% soln 1 gtt q6-12h produces desired response in most patients (patients with darkly pigmented eyes may require higher doses of pilocarpine) Cholinesterase inhibitor reserved for those who don't respond to other agents (3rd or 4th line tx) due to their high incidence of ocular and systemic side effects -miosis occurs within 10-30 min of echothiophate administration and can last up to 4 weeks -Refrigerate echothiophate until reconstituted, then stable for 1 month at room temp or 3 months if kept in the refrigerator **Systemic side effects: (up to 10% incidence)** headache/browache (tends to reduce with longer term use), nervousness, polyuria, hypersensitivity reactions -H/A, sweating, tremor, salivation, N/V, diarrhea, cramps, ↓ BP/HR (more likely with AchE inhibitors) (<1%) **Topical side effects: (up to 10% incidence)** local burning and stinging, photophobia, myopia leading to decreased vision at night, fixed small pupils. Cataracts can occur especially with echothiophate, and its prolonged use may cause formation of rounded nodules (cysts) of the pigmentary epithelium which may interfere with vision (usually reversible if discontinue drug). **Drug interactions:** Stop echothiophate prior to surgery because prolonged apnea with general anaesthetic
Direct acting agonists:			
Pilocarpine			
1,2,4,6®,(10✗⊗) % soln;	1 gtt q4-**12**h	$10 (10ml)	
4% gel PILOPINE-HS	½ " at HS	$23 (5g)	
Indirect Acting agonist (AchE inhibitor):			
Echothiophate soln ✗ PHOSPHOLINE IODIDE	**Summer 2001 - D/C by Co**		
Carbonic Anhydrase Inhibitors: ↓ secretion of aqueous humour by 40-60% *(~15-25% ↓IOP)*			Well tolerated and can be used as both monotherapy (q8h) or as adjunct treatment (q12h) **Caution**: in diseases that may induce acidosis (COPD, diabetes, hepatic/renal insufficiency), if Creatinine Cl < 30mL/min (eliminated renally) & possible cross-sensitivity with **sulfonamides** **Systemic side effects: (up to 10% incidence)** bitter taste (25%), H/A, nausea, fatigue -possible blood dyscrasias (as seen with PO acetazolamide: rare, non-dose-dependent effect) **Topical side effects: (up to 10% incidence)** immediate ocular discomfort (33% with dorzolamide, **improved with brinzolamide**), superficial punctate keratitis (10-15% with dorzolamide), blurred vision, allergy **Drug interactions:** salicylates have caused accumulation of oral acetazolamide (=CNS toxicity, metabolic acidosis); never been shown with eyedrops but it is possible, as ophthalmic CAInh's are absorbed systemically
Brinzolamide			
AZOPT 1% susp	1 gtt q**8**-12h	$26 (5ml)	
Dorzolamide	1 gtt q**8**-12h	$27 (5ml)	
TRUSOPT **2**% soln			
Prostaglandin F2α analogue: active metabolite (latanoprost acid) ↑'s outflow via uveoscleral route *(~25-35% ↓IOP)*			**Monotherapy or can be used as an adjunctive agent** (additive ↓ IOP with β-blockers, dipivefrin, and CAInh (po or topical)) Refrigerate prior to opening; once opened: may store at room temperature / cool place / refrigerate for a max of 6 weeks ◆no advantage of >1 gtt/day Well-tolerated, fewer systemic side effects and better night-time control of IOP vs. timolol but more ocular reactions occur **Systemic side effects: (up to 10% incidence)**, skin reaction (toxic epidermal necrolysis possible), upper respiratory tract infection/cold/flu (4%), chest pain, muscle & joint pain (1-2%) **Topical side effects: (up to 15% incidence)** altered iris pigmentation (7-22%) (esp. in patients with mixed pigmentation), foreign body sensation, blurred vision, & burning on instillation (>10%), mild conjuctival hyperemia (improves after 2-4weeks), dry eye, tearing, pain, photophobia, edema; darkening, thickening, & lengthening of the eyelashes, darkening of the eyelid (these are esp. NB for pt if tx is in one eye only) or discolor contacts. Rare anterior uveitis. **Drug Interactions**: any eyedrop with thimerosol as preservative→immediate precipitate will form (thus administer >5 minutes apart)
Latanoprost	1 gtt q hs	$39 (2.5ml)	
XALATAN 0.005% soln	1 study showed hs better than am dosing		
Travoprost	1 gtt qhs	$39 (2.5ml)	
TRAVATAN 0.004% sol			
Bimatoprost	1 gtt qhs	$46 (3ml)	
LUMIGAN 0.03% sol			

Combination Therapies: multiple mechanisms of action (synergy)	Sig	Cost#	
Dorzolamide/ Timolol : COSOPT (2%/0.5%) soln -bottle/Ocumeter Plus	1 gtt q12h	$38 (5,10ml)	Timolol and pilocarpine have additive effects on IOP (i.e. ~↓ 40-70%)
Timolol/ Latanoprost: XALACOM (0.5%/0.005%) susp ⊗	1 gtt hs	$44 (2.5ml)	Dorzolamide and timolol have additive effects on IOP (i.e. ~↓ 35-65%)
Timolol/ Pilocarpine: TIMPILO 2 (0.5%/2%) & TIMPILO 4 (0.5/4%) susp	1 gtt q12h	$27 (5ml)	XALACOM was better tolerated & more effective than COMBIGAN in one 6 month trial[7]
Levobunolol/ Dipivefrin: PROBETA (0.5%/0.1%) soln	1 gtt q12h	$25 (5,10ml)	Combination products may offer both **cost & convenience** advantages over same agents given separately
Timolol/ Brimonidine: COMBIGAN ⊗ (0.5%/0.2%) susp	1 gtt q12h	$31 (5ml)	

Notes: **POAG**= primary open angle glaucoma; **IOP**= intraocular pressure; **Cost #** per~month of therapy in Sask.. incl. mark-up & dispensing fee (when multiple strengths/intervals exist, **bolded strength/interval** used to calculate cost) ▼=covered by NIHB

✗=non-form ☎=EDS **AchE**=acetylcholinesterase **BP**=blood pressure **CAInh**=carbonic anhydrase inhibitors **CI**=contraindication **CNS**=central nervous system **H/A**=headache **MOA**=mechanism of action **PNS**=Parasympathetic nervous system **SE**=side effect ⊗=not NIHB

References: *RxFiles* - Glaucoma

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