

Table 1. Glaucoma Medications: Mechanisms, Dosing and Precautions

Brand	Generic	Mechanism of Action	Dosage/Avg. % Reduction	Product Sizes	Side Effects	Warnings
CHOLINERGIC AGENTS						
Direct						
Pilocarpine (generic)	Pilocarpine 1%, 2%, 4%	Increases trabecular outflow	BID-QID/15-25%	15ml	Headache, blurred vision, myopia, retinal detachment, bronchiole constriction, narrowing of angle	Angle closure, shortness of breath, retinal detachment
Indirect						
Phospholine Iodide (Pfizer)	Echothiophate iodide 0.125%	Increases trabecular outflow	QD-BID/15-25%	5ml	Same as above plus cataractogenic iris cysts in children, pupillary block, increased paralysis with succinylcholine	Same as above, plus avoid prior to any general anesthetic procedure
ALPHA-2 AGONISTS						
Alphagan P (Allergan)	Brimonidine tartrate 0.1%, 0.15% with Purite preservative	Decreases aqueous production, increases uveoscleral outflow	BID-TID/up to 26%	5ml, 10ml, 15ml	Dry mouth, hypotension, bradycardia, follicular conjunctivitis, ocular irritation, pruritus, dermatitis, conjunctival blanching, eyelid retraction, mydriasis, drug allergy	Monitor for shortness of breath, dizziness, ocular redness and itching, fatigue
Brimonidine tartrate (generic)	Brimonidine tartrate 0.15%, 0.2%	Same as above	Same as above	5ml, 10ml	Same as above	Same as above
Iopidine (Novartis)	Apraclonidine 0.5%	Decreases aqueous production	BID-TID/up to 25%	5ml, 10ml	Same as above but higher drug allergy (40%)	Same as above
BETA-BLOCKERS						
Non-selective						
Betagan (Allergan)	Levobunolol 0.25%, 0.5%	Decreases aqueous production	QD-BID/20-30%	5ml, 10ml, 15ml	Bronchospasm, bradycardia, hypotension, elevated triglycerides and decreased HDL = increased CV risk, CNS confusion, lethargy, depression, impotence, masked hypoglycemia, exacerbates myasthenia gravis	Monitor for shortness of breath, hypoglycemia, altered blood lipids, angina, dizziness
Betimol (Akorn)	Timolol hemihydrate 0.25%, 0.5%	Same as above	QD-BID/20-30%	5ml, 10ml	Same as above	Same as above
Carteolol (generic)	Carteolol 1%	Same as above	QD-BID/20-30%	5ml, 10ml, 15ml	Same as above, but less bradycardia	Same as above
Istalol (Bausch + Lomb)	Timolol maleate 0.5%	Same as above	QD/20-30%	2.5ml, 5ml	Same as levobunolol	Same as above
Optipranolol (Bausch Health)	Metipranolol 0.3%	Same as above	BID/20-30%	5ml, 10ml	Same as levobunolol	Same as above
Timoptic (Bausch Health)	Timolol maleate 0.25%, 0.5%	Same as above	QD-BID/20-30%	5ml, 10ml, 15ml	Same as levobunolol	Same as above
Timoptic XE (Bausch Health)	Timolol maleate gel-forming solution 0.25%, 0.5%	Same as above	QD/20-30%	5ml	Same as levobunolol	Same as above
Selective						
Betoptic S (Novartis)	Betaxolol 0.25%	Same as above	BID/15-20%	5ml, 10ml, 15ml	Same as levobunolol, but fewer pulmonary side effects	Same as above
CARBONIC ANHYDRASE INHIBITORS						
Topical						
Azopt (Novartis)	Brinzolamide 1%	Decreases aqueous production	BID-TID/15-20%	10ml, 15ml	Slight risk of parasthesia, metallic taste, nausea, malaise, depression, loss of libido, hypokalemia, aplastic anemia, metabolic acidosis, kidney stones, sulfonamide sensitivity	Avoid in sulfonamide allergies, sickle cell and renal disease
Trusopt (Merck)	Dorzolamide 2%	Same as above	BID-TID/15-20%	10ml	Same as above	Same as above
Oral						
Acetazolamide (generic)	Acetazolamide	Same as above	BID-QID/15-20%	125mg, 250mg, 500mg	Same as topicals, but more common	Same as above
Methazolamide (generic)	Methazolamide	Same as above	BID-TID/15-20%	25mg, 50mg	Same as above	Same as above
HYPEROSMOTIC AGENTS						
glycerine (oral)	50%	Decreases vitreous volume, increases anterior chamber depth	1-1.5gm/kg		Headache, back pain, diuresis, angina, pulmonary edema, heart failure, seizures, sub-arachnoid hemorrhage, nausea, vomiting	Shortness of breath, chest pain; administer drug slowly over ice
mannitol (IV)	5%, 10%, 15%, 20%	Same as above	1.5gm/kg		Same as above	Shortness of breath, chest pain
PROSTAGLANDINS						
bimatoprost (generic)	bimatoprost 0.03%	Increases uveoscleral outflow	QHS/27-33%	2.5ml, 5ml, 7.5ml	Hyperemia, iris pigment, hypertrichosis, conjunctival injection, keratitis, uveitis, ocular pain, cystoid macula edema	May darken eye color permanently, can induce dry eye symptoms
Lumigan (Allergan)	bimatoprost 0.01%	Same as above	QHS/27-33%	2.5ml, 5ml, 7.5ml	Same as above	Same as above
Travatan Z (Novartis)	travaprost 0.004%	Same as above	QHS/25-32%	5ml	Same as above	Same as above
Xalatan (Pfizer)	latanaprost 0.005%	Same as above	QHS/25-32%	2.5ml	Same as above	Same as above
Xelpros (Sun Ophthalmics)	latanoprost emulsion 0.005%; BAK-free	Same as above	QHS/25-32%	5ml	Same as above	Same as above
Zioptan (Akorn)	tafluprost 0.0015%; preservative-free	Same as above	QHS/25-32%	0.3 ml unit-dose	Same as above	Same as above
PROSTAGLANDIN/NITRIC OXIDE PRODUCER						
Vyzulta (Bausch + Lomb)	latanoprostene bunod 0.024%	Increases uveoscleral and trabecular outflow	QD/34.6%	5ml	Hyperemia, eye pain, hypertrichosis	No systemic effects
RHO-KINASE INHIBITORS						
Rhopressa (Aerie)	netarsudil 0.02%	Increases trabecular outflow, decreases episcleral venous pressure and aqueous production	QD/25-30%	2.5ml	Hyperemia, conjunctival hemorrhage, corneal verticillata	Significant red eye, no systemic effects
COMBINATION AGENTS						
Combigan (Allergan)	timolol 0.5%/brimonidine 0.2%	Decreases aqueous production	BID	5ml, 10ml, 15ml	See timolol and brimonidine	See timolol and brimonidine
Cosopt (Akorn)	timolol 0.5%/dorzolamide 2%	Decreases aqueous production	BID	10ml	See timolol and dorzolamide	See timolol and dorzolamide
Rocklatan (Aerie)	netarsudil 0.02%/latanaprost 0.005%	Increases trabecular outflow and extra-trabecular outflow, decreases aqueous production and episcleral venous pressure	QHS/20-40%	2.5ml	See netarsudil and latanaprost	See netarsudil and latanaprost
Simbrinza (Novartis)	brinzolamide 1%/brimonidine 0.2%	Decreases aqueous production	BID	8ml	See brinzolamide and brimonidine	See brinzolamide and brimonidine