South East London Area Prescribing Committee
Chronic Open Angle Glaucoma and Ocular Hypertension Treatment Pathway

1st Line Treatment

Prostaglandin Analogues (PGAs)

Latanoprost 50micrograms/ml - Preferred choice
Travoprost 40micrograms/ml (non-BAK preservative)
Only Travatan® brand = non-BAK preservative

Bimatoprost 100micrograms/ml
Option for moderate/advanced glaucoma or as an alternative to latanoprost if inadequate effect

Continue if target IOP has been achieved.

Beta Blockers

Use 1st line in unilateral glaucoma patients; aphakia and if no response to PGA treatment

Timolol 0.25%, 0.5%
Timolol 0.25%, 0.5% LA Gel
Betaxolol 0.25% *(if respiratory problems and timolol not tolerated)*
Proceed to 3rd and 4th Line Treatments if Beta Blockers are contraindicated or there is inadequate reduction in IOP.

Preservative Free Formulations:

Reserved for patients with a true preservative allergy and/or have evidence of epithelial toxicity and/or severe dry eyes

Prostaglandin Analogues

Latanoprost 50micrograms/ml PF - Preferred choice - (Monopost®)

Bimatoprost 300micrograms/ml PF
Option for moderate/advanced glaucoma or as an alternative to latanoprost PF if inadequate effect

Tafluprost unit dose 15micrograms/ml PF (Saflutan®)
Option if there are adverse effects with latanoprost PF

Beta Blockers

Timolol 0.25%, 0.5% drops PF
***Timolol 0.1% unit dose eye gel** (*specialist to initiate)

Proceed to 2nd line treatment if further reduction in IOP required and there is good response to PGAs or Beta Blockers (& no C/I)

2nd Line Treatment

Prostaglandin Analogue Plus Beta Blocker

Combination products
Latanoprost 50micrograms/ml with timolol 5mg/ml

Travoprost 40micrograms/ml with timolol 5mg/ml
(preferred choice for those allergic to benzalkonium chloride)
Only Duotrav® brand = non-BAK preservative

Bimatoprost 300micrograms/ml with timolol 5mg/ml

Separate products
-Prostaglandin analogue and *Timolol 0.1% unit dose eye gel

(*use for those patients with proven sensitivity to higher concentrations of beta blockers)

Preservative Free Formulations:

PGA + Beta Blocker:

Latanoprost 50micrograms/ml with timolol 5mg/ml unit dose PF (Fixapost®)
Preferred combination product choice

Bimatoprost 300micrograms/ml with timolol 5mg/ml unit dose PF (Ganfort® unit dose)
Preferred combination for moderate/advanced glaucoma or as an alternative to latanoprost with timolol PF if inadequate effect

Tafluprost 15 micrograms/ml with timolol 5mg/ml unit dose PF (Taptiqom®)
Option if there are adverse effects with latanoprost and timolol PF

Refer to guidelines for further details of this pathway

3rd and 4th Line Treatments

Carbonic anhydrase inhibitors

Dorzolamide 2%
Brinzolamide 10mg/ml
Acetazolamide 125-250 mg orally od to qds (Maximum usual daily dose 1g, short term in refractory cases 1.5 g)

Alpha adrenergic inhibitor

Brimonidine 0.2%
Used as monotherapy if there is no response to 1st or 2nd line treatments, or if other drops are contra-indicated. Use with PGAs and beta blockers if a further IOP reduction is required.

Carbonic anhydrase inhibitor & alpha adrenergic inhibitor
Brinzolamide1% with brimonidine 2%
Use where beta blockers are C/I or where 4 agents are required to reduce pressure;

Combination drops decrease risk of toxicity from preservatives

Beta Blocker plus carbonic anhydrase inhibitor/alpha adrenergic agonist

Dorzolamide 2% with timolol 0.5%
Brinzolamide 1% with timolol 0.5%
Brimonidine 0.2% with timolol 0.5%

Preservative Free Formulations:

Dorzolamide 2% PF

Carbonic anhydrase inhibitor plus beta blocker
Dorzolamide 2% with timolol 0.5% PF

Treatments for refractory cases

Apraclonidine 0.5%
HOSPITAL TO INITIATE: In patients not adequately treated by other drugs and not suitable for / waiting for laser treatment or surgery, and in patients with refractory glaucoma **for long term use.**
Pilocarpine 2% or 4%
Use in refractory cases only or in patients in whom pupil miosis is beneficial.

South East London Area Prescribing Committee. A partnership between NHS organisations in South East London: Bexley/ Bromley/ Greenwich/ Lambeth/ Lewisham & Southwark Clinical Commissioning Groups (CCGs) & GSTFT/KCH/SLAM/Oxleas NHS Foundation Trusts & Lewisham & Greenwich NHS Trust

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Guidelines for Ocular Hypertension (OHT) and Chronic Open Angle Glaucoma (COAG) Treatment

The purpose of the pathway and these guidelines is to provide an overview of how glaucoma treatment is managed and optimised for individual patients within the secondary & tertiary care glaucoma service.

Summary

Diagnosis of ocular hypertension (OHT) or chronic open angle glaucoma (COAG) should be by an ophthalmologist. Patients may be seen by glaucoma trained optometrists or nurse practitioners for their ongoing management. The initial supply of any new treatments are provided by secondary/tertiary care. All drug treatments are communicated to the patient's GP to provide continuity of medication supplies.

The recommended treatment options in this guideline are for newly diagnosed or currently treated patients seen by the hospital specialists. The pathway is also relevant to patients that have had glaucoma laser or surgery and to patients with primary angle closure glaucoma (PACG) or secondary glaucoma. There is no expectation that patients already being treated should have their treatment changed unless clinically indicated. Generic forms of branded products are suitable unless specifically indicated. These decisions should be made by consultant ophthalmologists.

Patients are managed based on individual management plans, taking into account many factors. Patients are treated to an individual intraocular pressure (IOP) target.

Treatment guidelines are outlined in the Royal College of Ophthalmologists Commissioning Document: Glaucoma. This has been accredited by NICE. Treatment guidelines and algorithms are also provided by the European Glaucoma Society.

Role of General Practitioner:

- To provide repeat prescriptions for glaucoma treatments once communicated by secondary care.
- In patients requiring long term (>3/12) oral Acetazolamide: 3 monthly blood tests are required to monitor renal function
- To provide feedback to glaucoma team if patient has possible allergy or toxicity to glaucoma treatment or if experiencing intolerable side effects (contact via letter, email or dedicated Glaucoma helpline - see contact details on page 5).

Prescribing Considerations for Initiation of Treatments for OHT and COAG

First Line Treatment (single agent)

- Treatment is initiated as indicated in the treatment pathway starting with prostaglandin analogues (PGAs), unless contraindicated or as below.
- Beta blockers are first line treatment for unilateral treatment, aphakia and if there has been no IOP reduction with PGAs.
- Patients prescribed topical medication are encouraged to continue with the same treatment unless: IOP is not sufficiently reduced, the glaucoma has progressed, or they are intolerant to the drug.
- If there has been no IOP response and the patient has been compliant with treatment, they should be switched to an alternative agent. Sometimes a different agent within the same class of drug may be tried first before switching to a different class.

Second Line Treatment (PGA and Beta Blocker)

- The most cost effective treatment is chosen as initial treatment. If there has been an adequate IOP reduction but not sufficient to meet the patient's target, then an additional drug should be added and the most cost effective combination should be chosen. For non-responders or if there has been an insufficient IOP reduction to a particular class(es) of drug, patients should be switched to an alternative drop or have treatments added, moving across the treatment pathway to 3rd and 4th line treatments as indicated, taking into consideration contraindications, tolerability and side-effects.

Third and Fourth Line Treatments

- Additional agents can be added when there is an insufficient response to PGAs and/or beta blocker. These can also be used as monotherapy if there has been no response to the drugs in steps one and two, or if contraindications.
- Oral Acetazolamide may be used as short term adjunctive treatment in patients with refractory glaucoma awaiting surgery or in those with presumed allergy to glaucoma drops in order to determine the causative agent. Acetazolamide may occasionally be used as a long term treatment in patients with refractory glaucoma intolerant of other treatment / surgery or unwilling to undergo laser or surgery.
- While the BNF states that Apraclonidine 0.5% should be used as short-term treatment, it has been widely used amongst Glaucoma specialists worldwide for almost 3 decades, is generally very effective and well tolerated by patients with minimal systemic side effects.

General Considerations

Prescribers will write the generic names in any communication, but will specify when this needs to be a particular brand.

- Reduce frequency of drops where possible by prescribing combined formulations to reduce preservative load and improve compliance/adherence to treatment

- For patients with insufficient IOP lowering, adherence to treatment and drop instillation technique are checked. If adherence and technique are adequate, one of the following should be offered: alternative or additional pharmacological treatment (more than one medication may be required), laser trabeculoplasty, or surgery Maximum drug treatment can consist of all four classes of topical pressure lowering drops and oral acetazolamide.

- For patients intolerant to prescribed medication, consider offering an alternative medication or a preservative free preparation if there is evidence that the person is allergic to or intolerant of preservatives. After trying two or more pharmacological regimens (which may include combinations), consider offering laser trabeculoplasty or surgery.

- Patients experiencing difficulty instilling drops should receive instruction on the correct use of eye drop administration aids. This may be provided by the HES or purchased from a pharmacist. Eye drop aids may be helpful and these are specific for a device type and size of bottle. If a patient requires an eye drop aid, they will usually require a specific brand of eye drop to ensure adequate fit as bottles vary in size, rigidity and shape and usually only fit a specific compliance aid. This can help reduce the need for a district nurse to instil the drops.

- Patients initiated on treatment should receive generic eye drops (if available), however in certain instances it may be appropriate to switch to a specific brand of a certain drug – e.g. unable to use some generic devices due to dexterity problems, or when the patient requires an eye drop aid to administer the drops. Where a specific brand is required, this will be clearly communicated to the GP in a clinic letter (including the reason why the specific brand is required) so that inadvertent switching of brands does not occur. Where there is no specific reason stated for branded prescribing in clinic communications, GPs will prescribe generically.

- As a routine, specialist clinicians should refer to eye drop medicines by their generic name in clinic letters and other communications, save for the example above, where a specific brand is definitely required.

- When a generic preparation becomes available following a patent expiry, these will be routinely used for patients currently on that drug, except those who are on a brand specific eye drop aid. Should a patient find it difficult to use a drop device after being switched (e.g. dexterity problems with a different device) the patient should be switched back to the branded product that they were able to use.

- Contra-indications and potential drug interactions are checked prior to prescribing medication. Please refer to the latest Summary of Product Characteristics for up to date prescribing information.
  In addition to the commonly known contraindications for use, the following medications are also contraindicated or used with caution in the following circumstances:-

PGAs: Caution if uveitis, macular oedema; diabetic maculopathy; loss of zonule or capsule integrity and uniocular treatment (as may cause change in lash and eye colour)

Beta Blockers: Caution if normotensive glaucoma, hypotension, respiratory impairment, bradycardia; used in morning only in patients with (or at risk of) nocturnal hypotension.

Carbonic Anhydrase Inhibitors: Caution if history of allergy to sulphonamides, renal stones, renal impairment or corneal endothelial dysfunction.

Alpha Adrenergic Inhibitors: Caution if cardiovascular instability or on MAOIs

Appropriate Use of Preservative Free Formulations

Benzalkonium chloride is a common preservative in most eye drops. There are reports of damage to the tear film and corneoconjunctival surface and various forms of conjunctivitis have been reported in patients receiving regular long-term treatment for glaucoma with eye drops preserved with benzalkonium chloride. Patients with dry eye syndrome and ocular surface disease are at increased risk of epithelial breakdown and exacerbation of their ocular surface disease.

Patients with COAG who are allergic to benzalkonium chloride should be offered a preservative-free preparation if there is evidence that the patient is allergic or intolerant of the preservative. NICE recommend that patients with OHT or suspected COAG and an allergy to preservatives should be offered a preservative free product if they are at high risk of conversion to COAG.

If there is moderate or severe ocular surface disease then it might be appropriate to avoid preserved drops and to consider laser trabeculoplasty or glaucoma surgery.

Preserved drops will normally be avoided in contact lens wearers. It may also be appropriate to prescribe preservative free drops in young patients starting on glaucoma treatment. There is a high likelihood that these patients will be on eye drops for life and long-term exposure to preservatives is a known risk factor for early failure of glaucoma surgery and ocular surface pathology.

If a patient requires preservative-free eye drops specifically this will be clearly stated in any communications to primary care.

Secondary Care Contacts:

Guys and St Thomas' Hospital Foundation Trust:
Glaucoma Helpline: 020 7188 9121
GlaucomaTeam@gstt.nhs.uk

Kings College Hospital NHS Trust:
Denmark Hill Site
Ophthalmology Outpatient Appointments: +44 (0)20 3299 1919
For routine referrals, please phone 44 + (0)20 3299 3878 or email kch-tr.KCHReferrals@nhs.net
After hours – contact the 2nd on-call ophthalmic registrar via King's main switchboard, tel 020 3299 9000.

Princess Royal University Hospital
West Kent Eye Centre, level 2, south wing
01689 865778

Queen Mary's Hospital, Sidcup
Monday to Friday, 8am – 4pm, and at weekends from 9am – 4pm
02083083071

References:

The Royal College of Ophthalmologists. Commissioning Guide: Glaucoma. June 2016
https://www.rcophth.ac.uk/wp-content/uploads/2016/06/Glaucoma-Commissioning-Guide-Recommendations-June-2016-Final.pdf

Glaucoma:Diagnosis and Management. NICE April 2009
https://www.nice.org.uk/guidance/CG85

Terminology and Guidelines for Glaucoma 4th Edition (June 2014), European Glaucoma Society

Drug Class	Notes	Brand name	1 month cost (Drug Tariff 06/19)
PGAs			
Latanoprost 50micrograms/ml	Generic available	Generic Xalatan	£7.92 (2.5ml) £12.48 (2.5ml)
Bimatoprost 100micrograms/ml	No generic available at this	Lumigan	£11.71 (3ml)

	strength		
Travoprost 40micrograms/ml	No benzalkonium chloride in Travatan brand only	Generic Travatan	£3.26 £10.95
Beta Blockers			
Timolol 0.25%	Generic available	Generic Timoptol	£0.98 (5ml) £3.12 (5ml)
Timolol gel forming drops 0.25%	Once a day formulation	Timoptol-LA	£3.12 (2.5ml)
Betaxolol 0.25%	Twice a day formulation	Betoptic	£2.66
Carbonic Anhydrase Inhibitors			
Dorzolamide 2%	Generic available	Generic Trusopt	£2.38 (5ml) £6.33 (5ml)
Brinzolamide 1%	Generic available	Generic Azopt	£2.18 (5ml) £6.92 (5ml)
Alpha 2 Agonist			
Brimonidine **0.2%**	Generic available	Generic Alphagan	£3.04 (5ml) £6.04 (5ml)
Apraclonidine 0.5%		Iopidine	£10.88 (5ml)
PGA + BB			
Latanoprost 50mcg/ml + timolol 5mg	Generic available	Generic Xalacom	£6.57 (2.5ml) £14.32 (2.5ml)
Bimatoprost 300mcg/ml + timolol 5mg		Ganfort	£14.16 (3ml)
Travoprost 40mcg/ml + timolol 5mg	No benzalkonium chloride	DuoTrav	£13.95 (2.5ml)
CAI + BB			
Dorzolamide 2% + timolol 5mg	Generic available	Generic Cosopt	£2.04 (5ml) £10.05 (5ml)
Brinzolamide 10mg + timolol 5mg		Azarga	£11.05 (5ml)
CAI + alpha 2 agonist			
Brinzolamide 10mg + brimonidine 2mg		Simbrinza	£9.23 (5ml)
Alpha 2 agonist + BB			
Brimonidine 2mg + timolol 5mg		Combigan	£10.00 (5ml)
Preservative Free			
PGAs			
Latanoprost 50mcg/ml		Monopost	£8.49 (0.2ml-30 units)
Tafluprost 15mcg/ml		Saflutan	£12.20 (0.3ml-30 units)
Bimatoprost 300micrograms/ml	Branded generic available	Eyreida Lumigan	£11.71 (3ml) £13.75 (0.4ml -30 units)
Beta Blockers			
Timolol 1mg/ml eye gel	Once a day formulation.	Tiopex	£7.49 (0.4g-30 units)
Timolol 0.25%	Twice a day formulation	Eysano	£8.45, (5ml)
CAI			
Dorzolamide 2%	Branded generic available	Eydelto Trusopt	£12.09 (5ml) £24.18 (60 units)
PGA + BB			
Latanoprost 50mcg/ml + Timolol 5mg		Fixapost	£13.49 (0.2ml-30 units)
Tafluprost 15mcg/ml + Timolol 5mg		Taptiqom	£14.50 (0.3ml-30 units)
Bimatoprost 300mcg/ml + Timolol 5mg		Ganfort	£17.94 (0.4ml-30 units)
CAI + BB			
Dorzolamide 2% + timolol 5mg	Branded generic available	Eylamdo Cosopt iMulti Cosopt Unit dose	£14.29 (5ml) £28.00 (10ml) £28.59 (0.2ml-60 units)