South East London Integrated Medicines Optimisation Committee
Chronic Open Angle Glaucoma and Ocular Hypertension Pharmacological Treatment Pathway

1st Line Treatment

360° selective laser trabeculoplasty (SLT) is recommended as 1st line treatment in people with newly diagnosed Ocular Hypertension (OHT) or Chronic Open Angle Glaucoma (COAG). See page 2 & 3 for more information

Prostaglandin Analogues (PGAs)

Latanoprost 50micrograms/ml - Preferred choice
Travoprost 40micrograms/ml (non-BAK preservative)
**Polyquad is a non-benzalkonium chloride (BAK) preservative*
Bimatoprost 100micrograms/ml

Beta Blockers

Consider as 1st line if only treating one eye or 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 2nd, 3rd and 4th Line Treatments if Beta Blockers are contraindicated or if inadequate IOP reduction.

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 - (Monopost® UDV or Lotacryn® multidose)
Preferredchoice dependent on patient's device preference

Travoprost 40micrograms/ml PF (VisuTRAX® UDV)

Tafluprost UDV 15micrograms/ml PF and multi-dose (Saflutan®)

Bimatoprost 300micrograms/ml PF (Lumigan® UDV or generic versions**)**

Beta Blockers

Timolol 0.25%, 0.5% drops PF
***Timolol 0.1% unit dose eye gel** (Tiopex®*)
** Restricted to those intolerant of higher concentrations or preserved preparations of timolol*
SEL IMOC formulary recommendation for Tiopex® available here

2nd Line Treatment

Prostaglandin Analogue Plus Beta Blocker

Latanoprost 50micrograms/ml with timolol 5mg/ml

Travoprost 40micrograms/ml with timolol 5mg/ml
(Duotrav® brand is the preferred option if allergic to BAK as it contains polyquad, a non-BAK preservative)

Bimatoprost 300micrograms/ml with timolol 5mg/ml

Separate products
Prostaglandin analogue and *Timolol 0.1% UDV eye gel (*use for patients intolerant of higher concentrations of beta blockers or drop preservatives)

Preservative Free Formulations:

PGA + Beta BlockerLatanoprost 50micrograms/ml with timolol 5mg/ml PF (Vizilatan duo® multidose or Fixapost® UDV)
Preferred choice dependent on patient's device preference

Tafluprost 15 micrograms/ml with timolol 5mg/ml PF (Taptiqom® UDV)

Bimatoprost 300micrograms/ml with timolol 5mg/ml PF (Ganfort® UDV**)**

Refer to guidelines for further details of this pathway on page 3**

Prostaglandin Analogue + Rho-kinase inhibitor

Latanoprost 50micrograms/ml with netarsudil mesylate 200micrograms/ml (Roclanda®)

In line with NICE TA 1009, Roclanda® is indicated if a fixed-dose combination has not reduced IOP enough or if a fixed-dose combination treatment containing beta-blockers is unsuitable.

South East London Integrated Medicines Optimisation Committee (SEL IMOC). A partnership between NHS organisations in South East London Integrated Care System: NHS South East London (covering the boroughs of Bexley/Bromley/Greenwich/ Lambeth/Lewisham and Southwark) and GSTFT/KCH /SLaM/ Oxleas NHS Foundation Trusts and Lewisham & Greenwich NHS Trust

Approved: Jan 2018 | **Updated** May 2025 | **Review date:** May 2027

3rd and 4th Line Treatments

Carbonic anhydrase inhibitors

Dorzolamide 2%
Brinzolamide 10mg/ml

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; SEL IMOC formulary recommendation available here

Beta Blocker + carbonic anhydrase inhibitor OR 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 (Vizidor duo® multidose; Cosopt® UDV or Cosopt multidose® - *dependent on device preference*

Treatments for refractory cases

Apraclonidine 0.5%
HOSPITAL TO INITIATE 1st 3 MONTHS SUPPLY: 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.**

Acetazolamide 125-250 mg orally od to qds (Maximum usual daily dose 1g, short term in refractory cases 1.5 g)

Pilocarpine 2% or 4%
Use in refractory cases only or in patients in whom pupil miosis is beneficial.

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 pharmacological and non-pharmacological treatment of glaucoma 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.
- To provide feedback to glaucoma team if patient has possible allergy or toxicity to glaucoma treatment or if experiencing intolerable side effects

In patients requiring long term (>3/12) oral Acetazolamide: 3 monthly blood tests are required to monitor renal function (RF). Although blood dyscrasias have been reported, these are idiosyncratic and not dose related, so while baseline full blood count and platelet level (FBC) are advisable, clinical monitoring is probably more relevant. FBC monitoring should be done along with RF if any concerns.

Non-Pharmacological Treatments of OHT or COAG

NICE guideline NG81 recommends much greater use of Selective Laser Therapy (SLT) treatment including the first-line use of 360° SLT to treat Chronic Open Angle Glaucoma (COAG) and Ocular Hypertension (OHT) with IOP more than 24mm Hg if patients have a risk of visual impairment within their lifetime.

Inclusions:

- Primary glaucomas with open angles and adequate view of trabecular meshwork
- Able to comply with laser procedure and tolerate laser lens

Exclusions:

- Patients with Pigment Dispersion syndrome or excessive trabecular pigmentation
- Patent declines laser treatment

NICE Recommendations: Initial treatment for OHT and COAG

- **Initial treatment for people with OHT:**
  - Offer 360° selective laser trabeculoplasty (SLT) to people with newly diagnosed OHT with IOP of 24 mmHg or more (excluding cases associated with pigment dispersion syndrome) if they are at risk of visual impairment within their lifetime.
  - Consider a second 360° SLT for people with OHT if the effect of an initial successful SLT has subsequently reduced over time

- **Initial treatment for people with COAG:**
  - Offer 360° SLT to people with newly diagnosed COAG that is not advanced (excluding cases associated with pigment dispersion syndrome)
  - Consider a second 360° SLT for people with COAG if the effect of an initial successful SLT has subsequently reduced over time

Pharmacological Treatments of OHT or COAG

Pharmacological treatment should only be offered as first line treatment for primary open angle glaucoma and ocular hypertension if SLT is not suitable or is declined by the patient.

First Line Pharmacological 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 Pharmacological Treatment (PGA and Beta Blocker or PGA and Rho-kinase inhibitor)

- 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.
- Addition of a beta-blocker to a PGA is the usual second line treatment, but netarsudil (a Rho-kinase inhibitor) offers an alternative mechanism of action and can be used if beta-blockers are unsuitable, e.g. contra-indications or likelihood of significant adverse effects. Netarsudil is available in combination with latanoprost as a fixed dose combination preparation (Roclanda®)
- In line with NICE TA 1009 latanoprost–netarsudil is recommended as an option for reducing intraocular pressure (IOP) in adults with primary open-angle glaucoma or OHT when a prostaglandin analogue alone has not reduced IOP enough, only if:
  - they have then tried a fixed-dose combination treatment and it has not reduced IOP enough, or
  - a fixed-dose combination treatment containing beta-blockers is unsuitable.
- 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 Hospital Eye Service (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.

Rho-kinase Inhibitors: commonest reported side effects are conjunctival hyperaemia (>50%) and corneal verticillata (~20%)

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.

Recent studies also indicate that benzalkonium chloride can worsen trabecular meshwork and Schlemm's canal function which can exacerbate outflow impairment and contribute to increase in IOP.

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 Call Back answerphone: 020 7188 9121 (calls will be responded to within 2 working days)
Email: Ophthalmologysecretaries@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/2020/08/Glaucoma-Commissioning-Guide-Long-June-2016-Final.pdf

Glaucoma: diagnosis and management. NICE Nov 2017, updated Jan 2022
https://www.nice.org.uk/guidance/ng81/chapter/recommendations

Latanoprost–netarsudil for previously treated primary open-angle glaucoma or ocular hypertension
https://www.nice.org.uk/guidance/TA1009/chapter/1-Recommendations

Evidence reviews for selective laser trabeculoplasty in ocular hypertension or chronic open-angle glaucoma adult patients
https://www.nice.org.uk/guidance/ng81/evidence/january-2022-evidence-review-for-selective-laser-trabeculoplasty-in-ocular-hypertension-or-chronic-openangle-glaucoma-adult-patients-pdf-10951196077

Terminology and Guidelines for Glaucoma 5th Edition (June 2021), European Glaucoma Society
https://eugs.org/educational_materials/6

South East London Area Prescribing Committee Chronic Open Angle Glaucoma and Ocular Hypertension Treatment Pathway (Sep 2019)
https://www.selondonics.org/wp-content/uploads/dlm_uploads/2022/11/Glaucoma-Ocular-Hypertension-treatment-pathway-January-2018.pdf