

Advancing glaucoma care: What's new in the 6th edition of the European Glaucoma Society guidelines

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Abstract

The 6th Edition of the European Glaucoma Society (EGS) Guidelines delivers a comprehensive, methodologically robust update to one of the most authoritative resources in glaucoma care. Building on the 5th Edition, this revision integrates the latest evidence, expert consensus, and enhanced patient engagement to support nuanced clinical decision-making. Notable innovations include a pan-European survey to prioritise clinical questions, incorporation of patient perspectives, expanded “Choosing Wisely” recommendations, and major updates on artificial intelligence, cost-effectiveness, genetics, childhood glaucoma, angle closure, and surgical approaches - complemented by redesigned figures and practical flow-charts. These Guidelines reaffirm the EGS commitment to evidence-based, patient-centred excellence, providing clinicians with a clear framework for diagnosis, monitoring, and treatment across the glaucoma spectrum.

Keywords

Angle closure < GLAUCOMA, childhood glaucoma < GLAUCOMA, diagnostic techniques < GLAUCOMA, epidemiology / risk factors < GLAUCOMA, glaucoma incisional surgery < GLAUCOMA, glaucoma medical therapies < GLAUCOMA, hereditary / genetics factors < GLAUCOMA, laser surgery < GLAUCOMA, open angle glaucoma < GLAUCOMA, tube shunts < GLAUCOMA

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History of the European Glaucoma Society guidelines

The European Glaucoma Society (EGS) released its first guidelines in 1998, with the goal of harmonising terminology and clinical practice across Europe. This first edition was managed by the EGS Subcommittee on Education and Research, chaired by Carlo E. Traverso and composed of Clive Migdal, John Thygesen, Franz Grehn, Yves Lachkar, Nikolai Siarov, Gabor Hollo, and Xavier Martin - the success of such an initiative established a unified foundation for glaucoma care in Europe.

The second edition (2003) expanded the content; the third edition (2008) achieved global recognition; and the fourth (2013) introduced transformative changes, including abandoning the fixed 21 mmHg Intraocular Pressure (IOP) and endorsing prostaglandin analogues as first-line therapy. The fifth edition (2020) strengthened evidence-based recommendations and enhanced practical applicability.

The sixth edition builds on this strong legacy with new concepts, renewed chapters, modernised algorithms, and expanded patient-centred strategies.^{1,2} This editorial

examines these innovations and their implications for contemporary practice.

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Evidence-based section: from pan-European prioritization to GRADE

While the GRADE methodology was already employed in the 5th Edition, the 6th Edition introduces a significant innovation: a comprehensive survey of EGS members and the Experts by Experience (EbE) patient panel³ to identify and prioritise the most clinically relevant questions.

Survey methodology

An online survey was distributed to all EGS members in September 2024 and to the EbE group in October 2024. Respondents were asked to confirm the relevance of the 16 questions included in the 5th Edition, including specific feedback, propose additional questions for consideration, and prioritise the three questions they regarded as most important to address. The EGS Task Force subsequently conducted a thematic analysis of the responses to identify the most frequently cited and clinically significant topics. This process informed the development of the final list of 11 key questions for the sixth edition.

Overview of systematic reviews

Evidence to inform these Guidelines was gathered in 2024 in collaboration with the USA-Cochrane Eyes and Vision Group by conducting an overview of systematic reviews on glaucoma interventions, prognosis, and diagnosis.

GRADE application

GRADE (Grading of Recommendations Assessment, Development and Evaluation) was applied to 11 key clinical questions (see Table 1 for a summary).⁴ Each question was addressed through the evidence gathered in the overview of systematic reviews. Recommendations were graded for both quality of evidence and strength, and included contextual commentary. GRADE was applied only to these questions; the remainder of the recommendations and suggestions throughout the text are consensus-based among experts.

Patient involvement

For the first time, the Guidelines incorporate direct input from the EbE patient panel throughout the book. In the evidence-based section, they have provided feedback on the previous edition's evidence-based clinical questions and have participated in the prioritisation of the new questions. Their contributions also include a new chapter titled "*What Matters to Patients*", practical communication tips for clinicians, and a dedicated section addressing the needs of paediatric patients. Throughout the document, the Guidelines emphasise empathy, shared decision-making,

and strategies to overcome anxiety, information gaps, and adherence challenges.

Expanded "choosing wisely" section

Now featuring fifteen explicit "do not" recommendations aimed at reducing misconceptions and avoiding low-value practices in clinical care. See Figure 1 for the complete Choosing Wisely section.

Substantially revised textbook sections: a closer look

The textbook component of the 6th Edition has been comprehensively revised to ensure clarity, accessibility, and clinical relevance. All chapters have been updated to reflect the latest evidence and best practices, supported by new systematic reviews that strengthen the scientific foundation of recommendations. To enhance usability, alert boxes highlighting key information have been added throughout the text, and links to related EGS publications provide readers with seamless access to complementary resources.

Cost-effectiveness

This edition presents a structured analysis of cost-effectiveness in glaucoma management. Selective Laser Trabeculoplasty (SLT) emerges as a cost-effective option when used as a first-line treatment,⁵ offering both clinical and economic advantages. For patients with advanced glaucoma, early trabeculectomy may also prove cost-effective,⁶ potentially reducing long-term disease burden and associated costs. In contrast, treatment of ocular hypertension is generally justified only for high-risk individuals. Broad population screening has not yet proven cost-effective, though emerging diagnostic technologies and improved risk-stratification methods may eventually support more targeted screening strategies.

Genetics

The genetics section of the 6th Edition has been substantially expanded to reflect advances in our understanding of glaucoma's hereditary components. It now includes a detailed discussion of Mendelian mutations, such as those in MYOC and CYP1B1, as well as complex genetic variants that contribute to disease susceptibility. Despite these developments, routine genetic testing is not recommended for all patients with primary open-angle glaucoma. Instead, testing should be considered in familial cases of early-onset disease, where it may inform diagnosis and counselling. The Guidelines also acknowledge the growing interest in polygenic risk scores as a tool for predicting glaucoma risk; however, these remain investigational and are not yet validated for clinical use.

Table 1. Summary of the 11 key clinical questions and the recommendations.

Question	Recommendation	Evidence level	Recommendation strength
Q1: What risk factors should we consider when assessing a person with or at risk of glaucoma?	High IOP, pseudoexfoliation, older age, family history, and myopia were confirmed as major risk factors.	High	Strong
Q2: What is the recommended first-line treatment for POAG?	Prostaglandin analogs and SLT are both recommended as first-line options.	High	Strong
Q3: What is the most effective IOP-lowering medication?	Prostaglandin analogs are the most effective medication, and they are usually recommended as first-choice medical treatment for open-angle glaucoma.	High	Strong
Q4: How can clinicians help patients adhere to the medical treatment?	Simplified regimen, education, effective communication (e.g., asking open questions), alarms/messages.	Very Low	Strong
Q5: What is the recommended surgical treatment for non-advanced open-angle glaucoma?	Trabeculectomy remains the most effective glaucoma surgery in terms of IOP lowering. Stand-alone MIGS techniques mainly aim to reduce the IOP and/or the medication burden in patients with early to moderate open-angle glaucoma. Bleb-forming techniques have the potential for greater IOP reduction when compared to MIGS.	High for trabeculectomy; Low for stand-alone MIGS and alternative bleb-forming surgeries.	Strong
Q6: What is the recommended surgical treatment for advanced open-angle glaucoma?	In advanced open glaucoma, trabeculectomy is the most effective glaucoma surgery to obtain low target IOPs. Trabeculectomy can be offered as a primary intervention.	High	Strong
Q7: What is the recommended approach for patients with early or moderate open-angle glaucoma and visually significant cataracts?	– IOP at or near target: Phacoemulsification alone or phacoemulsification with MIGS. – IOP significantly above target: Glaucoma intervention should be offered. Bleb-forming surgery with or without phacoemulsification is advisable.	High	Strong
Q8: What is the recommended approach for patients with advanced open-angle glaucoma and visually significant cataracts?	– IOP at target: Phacoemulsification alone is a good option; phacoemulsification may be combined with MIGS as an opportunity to lower IOP more or to reduce drop burden. – IOP above target: Glaucoma intervention should be offered. Bleb-forming surgery with or without phacoemulsification is advisable.	Low	Strong
Q9: Are neuroprotective agents or alternative treatments recommended?	There is no evidence to support that acupuncture, cannabinoids, or alternative treatments have a role to play in glaucoma management. There is not enough evidence to recommend the use of neuroprotective agents in glaucoma.	Low	Strong

(continued)

Table 1. Continued.

Question	Recommendation	Evidence level	Recommendation strength
Q10. What is the recommended frequency of testing and monitoring?	There is no evidence regarding which combination of tests or testing frequency improves patient outcomes at a sustainable cost. See recommended tests for diagnosis and monitoring in flow chart IX. Follow-up intervals of less than 1 year for ocular hypertension are unlikely to be cost-effective. Increasing the frequency may be needed based on various factors such as glaucoma severity, faster progression rate, non-achievement of target IOP, presence of other high-risk factors, the need for a second test to establish baseline values for future comparisons, or suspicion of artifacts.	Low	Strong
Q11. Is AI recommended for glaucoma management?	Although they have promising potential, there is insufficient evidence to support the use of AI algorithms in current clinical practice.	Low	Strong

Adapted from the 6th Edition of the EGS Terminology and Guidelines key questions and evidence-based recommendations section.

Q: question; IOP: intraocular pressure; POAG: primary open angle glaucoma; MIGS: minimally invasive glaucoma surgery; AI: artificial intelligence.

Artificial intelligence (AI)

A new section critically appraises AI's potential in glaucoma care. While AI shows high diagnostic accuracy, limitations in generalizability, interpretability, and data privacy preclude its current clinical use. Future directions include federated learning, generative AI, and multimodal models.

Childhood glaucoma

Updated to reflect Childhood Glaucoma Research Network (CGRN) classification⁷ and emphasise multidisciplinary care. Surgery remains the mainstay of treatment, with angle surgery as first-line and Glaucoma Drainage Devices (GDDs) or filtration surgery for refractory cases. Medication use is limited due to age-specific contraindications.

Angle closure

A mechanism-based classification is introduced, enabling more tailored management. Importantly, laser peripheral iridotomy (LPI) is no longer recommended for all primary angle closure suspects (PACS); its use is now reserved for individuals at higher risk of progression. In addition, clear-lens extraction has gained support as a preferred option in selected high-risk cases, particularly those with elevated intraocular pressure or established primary angle closure glaucoma. These recommendations are grounded in evidence from landmark trials such as ZAP,⁸ ANA-LIS,⁹ and

EAGLE,¹⁰ which have reshaped our understanding of risk-benefit profiles for prophylactic and therapeutic interventions in angle closure disease.

Surgical management of glaucoma

This 6th Edition builds on the EGS guide on surgical innovation,¹¹ providing an updated, evidence-based overview of evolving glaucoma surgical techniques.

The guidelines reaffirm that traditional trabeculectomy remains the most effective method for achieving very low IOP over the long term, making it particularly suitable for advanced glaucoma and cases requiring extremely low target pressures. Despite the emergence of newer procedures, trabeculectomy continues to be the gold standard for durable IOP control.

Minimally Invasive Glaucoma Surgery (MIGS) procedures aim to enhance trabecular or suprachoroidal outflow with minimal anatomical disruption, offering a favourable safety profile, faster recovery, and reduced postoperative care. They are generally indicated for mild to moderate open-angle glaucoma or ocular hypertension, often combined with cataract surgery. However, the guidelines caution against overuse of MIGS in rapidly progressing disease, emphasising that these techniques provide only modest IOP reduction and may not meet the needs of advanced cases.

Bleb-forming shunt devices create a subconjunctival filtering bleb without a plate and are usually referred to as minimally invasive bleb surgery (MIBS); however, sight-threatening complications can still occur. These are

I.4 Choosing wisely / Things to avoid



- 1) **Do not use in clinical practice research results derived from samples which do not adequately represent your patient.**
- 2) **Do not perform Laser peripheral iridotomy (LPI) routinely in otherwise healthy Primary Angle-Closure Suspect (PACS) eyes.**
LPI is advisable only in high-risk PACS eyes (e.g. higher baseline IOP, high hypermetropia, antidepressants or benzodiazepines use, patients that need frequent pupil dilation).
- 3) **Do not perform clear lens extraction in patients below 50 years of age with angle closure at low risk of visual loss.**
Evidence suggests that clear lens extraction is a valid first line intervention for a specific group of PAC patients, e.g. those with high IOP and above 50 years of age.
- 4) **Do not use anterior chamber angle imaging as a replacement for gonioscopy.**
The accuracy of anterior segment imaging in diagnosing angle closure is uncertain. Imaging misses relevant information (e.g. pigmentation) and angle closure features (e.g. peripheral anterior synechia or ciliary processes)
- 5) **Do not correct IOP measurements with CCT-based algorithms.**
They are not validated and should be avoided.
- 6) **Do not focus optic disc assessment on cup/disc ratio.**
Observe the ONH directly with slit lamp or direct ophthalmoscope checking disc appearance, size, shape and the thickness and colour of the rim. A green filter light can help to observe RNFL around the optic disc.
- 7) **Do not diagnose glaucoma based on OCT only.**
OCT on its own does not provide a clinical diagnosis of glaucoma, just a statistical deviation from a reference database.
- 8) **Do not make clinical decisions based on AI only.**
Technologies may support but do not replace clinical judgment.
- 9) **Do not offer genotyping routinely to all POAG patients.**
Individuals from families with multiple members affected with POAG at a relatively young age should be offered the opportunity to undergo genetic testing for MYOC mutations.
- 10) **Do not rely on neuroprotective strategies over IOP-lowering therapies.**
Treatment priority should be reaching the target IOP with established hypotensive therapies.
- 11) **Do not presume that acute angle closure is always due to pupil block.**
Pilocarpine may worsen angle closure due to lenticular and retro-lenticular mechanisms.
- 12) **Do not dismiss axial length measurements in patients with angle closure.**
Shorter eyes are at particular risk of surgical complications and should be planned accordingly.
- 13) **Do not perform further interventions in blind painless eyes with high IOP.**
Once the vision is lost, there is no need to perform further interventions except for painful eyes when pain is due to high IOP.
- 14) **Do not consider MIGS as a procedure without risks or costs.**
- 15) **Do not use MIGS on a rapidly worsening patient**
MIGS are mostly used in to offer the opportunity to mildly lower the IOP and decrease medications in patients with OSD, poor tolerance, or poor compliance.

Figure 1. Updated choosing wisely section of the 6th edition of the EGS guidelines. Reproduced from the 6th Edition of the EGS Glaucoma and Terminology Guidelines with permission of the EGS foundation.

typically reserved for moderate to advanced glaucoma, with success dependent on proper implant positioning and careful use of antimetabolites to balance efficacy and risk.

For patients with failed filtration surgery or high-risk disease, long-tube GDDs remain an important surgical option. These implants consist of a synthetic tube connected to a plate placed retroequatorially to facilitate aqueous outflow. They are typically indicated for refractory glaucoma, including secondary and paediatric cases; however, their use is associated with potential complications such as hypotony, implant exposure, and corneal decompensation.

The guidelines underscore that surgical choice must be individualised, considering disease severity, prior interventions, ocular anatomy, and patient-specific factors. Updated recommendations stress the importance of realistic expectations regarding outcomes, particularly with MIGS, and advocate for a tailored approach to optimise long-term vision preservation.

Upgraded flowcharts and figures

The visual component of the Guidelines has been significantly enhanced, with flowcharts and figures redesigned to improve clarity and usability. These updated tools provide clinicians with streamlined pathways for diagnosis, treatment selection, and monitoring, making complex decision-making processes more intuitive and accessible. The new flowcharts integrate evidence-based recommendations and practical steps, ensuring that guidance is not only comprehensive but also easy to apply in everyday clinical practice.

Conclusion

The 6th Edition of the EGS Guidelines represents a step forward in delivering modern, evidence-based, and patient-centred glaucoma care. By combining rigorous methodology, patient involvement, updated clinical content, and practical decision-making tools, this edition equips clinicians with a comprehensive and adaptable framework for managing glaucoma in an evolving healthcare landscape.

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