European Glaucoma Society

EGS guidelines – external reviews

Review by J. Stein (on behalf of AGS)

EGS guidelines notes

Overall this is an excellent document with a wealth of valuable information presented in a very concise manner. The Documents committee has read over the Guidelines, and proffers the following comments and questions:

Page 22: Q1 – Recommended testing at first assessment

CCT measure is listed as a weak recommendation. While we agree the role of CCT is debatable as an independent risk factor for glaucoma, and IOP corrected measurements should not be used, the role of CCT in predicting OHT to glaucoma conversion and glaucoma progression is well established (as stated in Q4). We would suggest the recommendation for the measure to be obtained be changed to "strong". An alternative would be to make a strong recommendation to assess "corneal properties" as part of a glaucoma work-up. This could include CCT but more specifically corneal hysteresis (and possibly Corvis ST) measurements of corneal deformation. There is mounting evidence that these measures can help stratify risk in suspect and glaucoma patients and can aid in treatment decisions. (See CH reviews: Deol et al Curr Opin Opth 2015 26(2):96-102, Lian et al, Int Ophth 2019 39(8): 1909-1916)

A similar comment about using OCT having a weak recommendation; we agree completely that it does not replace exam/VF testing, but is an extremely well established and useful tool in initial assessment of glaucoma, especially in situations where VF testing is unreliable.

Page 27 Q12

Would also add that while only the LiGHT trial is available for SLT, the Glaucoma Laser Trial showed that ALT is noninferior to betaxolol. SLT has superseded ALT, but should be considered as initial treatment in appropriate open angle patients

Page 27 Q13. While trabeculectomy is certainly the gold standard for surgery for glaucoma, I think this recommendation that Trab with antifibrotic agents as initial surgical treatment for open angle glaucoma is outdated

Page 27 Q13: Recommended surgical treatment for open angle glaucoma.

The recommendation for trabeculectomy as the initial surgical treatment for POAG in modern glaucoma treatment seems too broad of a statement. While clarified well in the following paragraph, this initial statement may be too strong and not reflect current practices. The rates of trabeculectomy have fallen (see Arora et al Ophth 2015 122(8): 161524) and many surgeons choose alternate options unless severe disease and/or need for very low IOP. The comments section does discuss the role of MIGS. In 2020, in practice, trabeculectomy is the first line surgical treatment for certain patients depending on their disease severity and target pressure, but certainly is not the initial treatment for many mild and moderate patients. A change in the recommendation for trabeculectomy as the surgery of choice for severe POAG may be more appropriate.

Page 29 Q16. The role of goniosynechiolysis in patients who have had PAS for less than 12 months could be added.

Page 41 EMGT

It should be clarified that the treatment protocol was standardized based on treatment and not IOP goal. This is important in understanding why IOP fluctuation was not found to be an independent risk factor for

progression in EMGT while it was in other studies. See comment by Dr. Palmberg Ophth 2007 114(2):203-204

Page 31: for FH, also ask regarding specifically history of blindness in family members

Cortical steroid therapy – would include route, dose, and frequency

Ocular trauma – while contusion is reasonable, but would broaden to blunt vs penetrating trauma

Systemic disease – would also as about any episodes of life-threatening anemia or hypotension

Social history: would ask about the use of head down positioning (yoga, inversion tables), musical instruments (such as wind instruments).

Page 32

Anxiety associated with glaucoma and the information gap

This section could also emphasize that besides empathy, proper education around the diagnosis and the course of disease is important to alleviate anxiety. Proper understanding of the disease will help adherence and also encourage follow up, which will help to decrease the risk of morbidity associated with the disease.

Page 32-33

The information gap

A comment that having handouts and flyers that explain the disease, the treatment, etc. for patients to take home is helpful could be added

Page 36

I.6.4. We suggest a change to “glaucoma associated with normal range IOP is more likely to be underdiagnosed”

Page 44 – ZAP trial

The exclusion criteria of post dilation/dark provocation IOP rise should be mentioned and also that NCT was used to measure IOP as neither of these are typical in most ophthalmology practices.

Page 45. Studies comparing treatments in open angle
In addition to AGIS and CIGTS, would also add discussion of 5FU study, TVT (PMID 22245458) and pTVT (PMID: 29477688, 31727428) and ABC (PMID: 25439606) and AvB (PMID 27544023) studies.

Page 60

Alternative tonometers

Would also add the Perkins tonometer, a good alternative to GAT that is handheld

Also would add the Diaton, which is good for patients with keratoprosthesis.

Page 58: Figure B. Suggest changing to higher than “actual” IOP, lower than “actual” IOP

Page 63: Corneal wedge at the Figure II.1.3 is not obvious in this illustration.

Page 67. The anterior chamber looks more shallow than original in Picture 3 in Figure II.1.6. With indentation, would think anterior chamber would be little deeper.

Page 68. In light of social changes occurred since the implementation of Spaeth classification, “ queer” to describe concave iris configuration may sound unusual to new generation of doctors. Perhaps neutral wording i.e; “d” for dipped or c for “cupped” or keeping “q” but avoiding “queer” could be considered.

Page 71. It is hard to appreciate AC depth differences among various drawings in Fig II.1.8.

Page 78. Figure II. 1.13. Regarding label of column “Measured vertical diameter of optic nerve”: presumably this is uncorrected measurements but clarification would be great.

Pages ~80-85

It would be valuable to include a section on the structure-function relationship in glaucoma assessment and progression analysis, methods/theories popularized by Dr. Don Hood and others over the last many years. There are many publications on this subject and this concept is now well incorporated in clinical assessment and decision making, and is also being included in software analyses programs.

A brief section explaining the use of ERG in glaucoma diagnosis/monitoring would also be useful. While the routine use of these technologies is debatable, the use of machines such as the Diopsys clinical unit has become fairly wide spread (at least in the US). A description of the potential uses and limitations would add to completeness.

Page 96. Nanophthalmus could be added to II.2.1.3.1 or somewhere appropriate.

Page 104

II.2.3.1.2 Pigmentary Glaucoma. Consider a brief discussion of the role of Laser Peripheral Iridotomy – currently not supported by the literature

Page 115. Table for management of Chronic Angle closure might be better placed after management of acute primary angle closure attack, and adding a definition of Chronic angle closure glaucoma is recommended. FC VII shows algorithm of recommending using Pilo first, then Laser PI. Maybe needs to be elaborated as this is little bit different.

Page 118. FC VIII – Management of acute primary angle closure attack. Decreased AH production is shown, but not the step to dehydrate the vitreous as included in the text

Page 123. II.2.5.3.3. Inferior iridectomy could be added to the treatment.

Page 129. The box “The goal of care …” is repeated on page 129 and 131

Page 130. Fig 11.3.1 B line is missing.

Page 146. Methazolamide –is not it available in Europe?

Page 147. Table 3.4; May add Brimonidine 0.15 %, 0.1 %

Page 166 II.3.13.2.4 The term “Micro-Incisional Glaucoma Surgery” is preferred over “Minimally Invasive” because minimally invasive may provide a misconception that these procedures are easy to perform and low risk. Unfortunately this can lead to misconceptions by insurers / payors of the technical skills needed to perform these procedures properly, which can have a negative impact reimbursement. ‘Minimally invasive’ may also be a little misleading to patients since clearly these procedures still carry some risks and need to be done in an OR setting.

See AGS paper:
https://www.ophthalmologyglaucoma.org/article/S2589-4196(19)30361-8/pdf

Page 170. Please specify the volume of Mitomycin C Intraoperative to be injected (This is usually 0.1 mL).

There seems to be quite a difference in concentration intraoperative (let’s say if 0.1 ml used, total would be 50 micron if 0.5 mg/ml used) vs post-operative use (2 micron). Please confirm

European Glaucoma Society

Review Daniel Grigera (on behalf of LAGS)

Original statements are included. Suggested modifications, their rationale and references are highlighted below.

"Q5 (page 24). Anterior chamber angle evaluation with imaging tests: are they recommended to diagnose people with angle closure?

Recommendation: Anterior chamber angle imaging cannot replace gonioscopy. Gonioscopy should be performed in every patient evaluated for glaucoma.

Level of evidence: low

Strength of recommendation: strong"

The recommendation rightly supports the use of gonioscopy but says little about a role for imaging, which is the core of the question. The strength of the recommendation is strong but, when reading the text of it, it seems to refer more to gonioscopy than to imaging. This deserves a modification (see the suggestions below).

"Comment: Anterior chamber angle imaging devices can be useful in some circumstances such as triage or in eyes where the angle cannot be visualized by gonioscopy. However anterior chamber angle imaging should not replace gonioscopy since features as peripheral anterior sinechia, pigment and other secondary causes of trabecular dysfunction may be missed".

Again, we agree that anterior chamber imaging cannot replace gonioscopy. But to say that AC imaging is only useful for triage or when the angle cannot be seen, is underestimating the usefulness of such examinations.

1) Is it useful to know the type of anatomical configuration of the narrow angle? That is, relative pupillary block (RPB)[1], plateau [2], increased iris thickness [3,4], etc of our patient?

2) Is it useful to know whether a PACS eye has a lens vault/lens width [5,6] consistently exceeding normal values? In other words, is it important, on the first examination of such an eye, to obtain signs suggesting a role for the lens in the narrow angle?

3) Appositional closure can be better identified with imaging than with gonioscopy, according to the Liwan Eye Study [7].

Angle configuration and lens data are not easily provided by gonioscopy, or not provided at all. A plateau iris may, in some cases, be confirmed by indentation gonioscopy. Regarding the role of the lens, the "volcano sign" is gonioscopically visible, but it is by no means an early sign.

Suggested modifications:

Recommendation: Anterior chamber angle imaging is complementary to gonioscopy. It cannot replace it. Gonioscopy should be performed in every patient evaluated for glaucoma.

"Comment: Anterior chamber angle imaging devices can be useful to identify the predominant configuration of a narrow angle, to estimate -to some extent- the influence of the lens, for triage, and in eyes where the angle cannot be visualized by gonioscopy. However, anterior chamber angle imaging should not replace gonioscopy since features as peripheral anterior sinechiae, pigment and other secondary causes of trabecular dysfunction may be missed".

Q14, (page 28): What is the recommended intervention for primary angle closure disease?

With the exclusion of eyes with cataract, following an acute attack of angle closure (AAC) or nanophthalmos.

Interventions depend on the spectrum of disease and presence of cataract. Laser and surgical treatment is typically combined with medical treatment.

Primary angle-closure suspect (PACS):

Comment: Not all patients with PACS need laser peripheral iridotomy (LPI). Evidence from China suggests that there is a low risk of disease progression without LPI (ZAP trial, see 1.7.s.1). No studies in white European eyes.

Recommendation: LPI in high-risk individuals, e.g high hyperopia, patients requiring repeated pupil dilation for retinal disease or with difficult access to healthcare facilities.

Level of evidence: low

Strength of recommendation: “weak”

Iridotomy benefits eyes with some degree of relative pupillary block (RPB) component in their configuration [8-10]. Gonioscopy supplemented by imaging (not used in the ZAP study [11]) can identify the RPB component: increased iris convexity, narrow iris-lens contact area and reduced ACD.

Suggested modification to the recommendation: LPI in high-risk individuals, e.g high hyperopia, patients requiring repeated pupil dilation for retinal disease or with difficult access to healthcare facilities. Identifying some component of relative pupillary block by gonioscopy/imaging can further help in the indication of LPI in these individuals.

Note: Should this modification to recommendation be accepted, it must reappear in Treatment (page 115)

1. Caronia RM, Liebmann JM, Stegman Z, Sokol J, Ritch R. Increase in iris-lens contact after laser iridotomy for pupillary block angle closure. Am J Ophthalmol. 1996 Jul;122(1):53-7.

2. Pavlin CJ, Ritch R, Foster FS. Ultrasound biomicroscopy in plateau iris syndrome. Am J Ophthalmol. 1992;113(4):390-395.

3. Wang BS, Narayanaswamy A, Amerasinghe N, Zheng C, He M, Chan YH, Nongpiur ME, Friedman DS, Aung T. Increased iris thickness and association with primary angle closure glaucoma. Br J Ophthalmol. 2011 Jan;95(1):46-50.

4. Ku JY, Nongpiur ME, Park J, Narayanaswamy AK, Perera SA, Tun TA, Kumar RS, Baskaran M, Aung T. Qualitative evaluation of the iris and ciliary body by ultrasound biomicroscopy in subjects with angle closure. J Glaucoma. 2014 Dec;23(9):583-8.

5. Tan GS, He M, Zhao W, Sakata LM, Li J, Nongpiur ME, Lavanya R, Friedman DS, Aung T. Determinants of lens vault and association with narrow angles in patients from Singapore. Am J Ophthalmol. 2012 Jul;154(1):39-46.

6. Nongpiur ME, He M, Amerasinghe N, Friedman DS, Tay WT, Baskaran M, Smith SD, Wong TY, Aung T. Lens vault, thickness, and position in Chinese subjects with angle closure. Ophthalmology. 2011;118(3):474-479.

7. Kong X, Foster PJ, Huang Q, Zheng Y, Huang W, Cai X, He M. Appositional closure identified by ultrasound biomicroscopy in population-based primary angle-closure glaucoma suspects: the Liwan eye study. Invest Ophthalmol Vis Sci. 2011 Jun 7;52(7):3970-5.

8. Nonaka A, Iwawaki T, Kikuchi M, Fujihara M, Nishida A, Kurimoto Y. Quantitative evaluation of iris convexity in primary angle closure. Am J Ophthalmol. 2007 Apr;143(4):695-7.

9. Henzan IM, Tomidokoro A, Uejo C, Sakai H, Sawaguchi S, Iwase A, Araie M. Ultrasound biomicroscopic configurations of the anterior ocular segment in a population-based study the Kumejima Study. Ophthalmology. 2010 Sep;117(9):1720-8, 1728.e1.

10.Kwon J, Sung KR, Han S, Moon YJ, Shin JW. Subclassification of Primary Angle Closure Using Anterior Segment Optical Coherence Tomography and Ultrasound Biomicroscopic Parameters. Ophthalmology. 2017 Jul;124(7):1039-1047.

11. Jiang Y, Chang DS, Zhu H, Khawaja AP, Aung T, Huang S, Chen Q, Munoz B, Grossi CM, He M, Friedman DS, Foster PJ. Longitudinal changes of angle configuration in primary angle-closure suspects: the Zhongshan Angle-Closure Prevention Trial. Ophthalmology. 2014 Sep;121(9):1699-1705.

Dynamic gonioscopy by indentation or compression (page 66):

It may be useful to specify what a “small diameter lens for indentation” is. All goniolenses designed for indentation gonioscopy (Zeiss, Posner, Sussmann) have a contact area diameter of 8.5 or 9mm. Most regular diagnostic goniolenses have a contact area diameter of ≅15mm.

Review Min Hee Suh (on behalf of WGA)

104 page Pseudoexfoliative or exfoliative glaucoma Features 8th row

- Please change “OP” to “IOP”

107page : Uveitic glaucoma

5-1. Treatment: “PGA can be used as first-line therapy in eyes with well controlled uveitis”

- Is there evidence for this phrase? PGA is considered to be a 3rd line therapy (reference: https://eyewiki.aao.org/Uveitic_Glaucoma). In clinical practice, although uveitis is well controlled, I usually reserve PGA due to the possibility of inflammation.

5-2. I think it would be better to make a section regarding the Glaucomatocyclitic crisis (Posner-Schlossman_Syndrome). (reference: https://eyewiki.aao.org/Glaucomatocyclitic_Crisis_(Posner-Schlossman_Syndrome). GCC is differentiated from typical chronic uveitis by having high IOP with mild symptoms and mild anterior chamber reaction. GCC also has normal IOP and no signs of uveitis between attacks.

European Glaucoma Society

Review Carolina P.B. Gracitelli (on behalf of WGA)

1) Page 76. I would add in this information in the optic disc haemorrhages: typically progressively disappear within a few weeks.

2) Page 80. “OCT is based on interferometry and is the most commonly used test”. Delete “most commonly used test”. Compared to what? Some countries people don’t use OCT more than retinograph or visual field.

European Glaucoma Society

Review Tanuj Dada (on behalf of WGA)

Review of EGS Guidelines page 127-171, Treatment of glaucoma

Excellent Guidelines. A few suggestions below :

General

1. If mind maps can be constructed for each major section, it can give the reader an excellent overview and approach to the topic on a single page, which will be easy to recall and reproduce
2. Important / key points on a page can be highlighted / bold / italics or given separately as bullets on the empty space on a page
3. Glaucoma is a disease which should be approached in a holistic manner and not just as an ocular problem requiring lowering of IOP. Patients and caregivers suffer from anxiety, depression and poor quality of life. A systemic evaluation to look for other mental/physical illness, drug interactions and lifestyle/behavioral interventions to reduce stress should be included.
4. Mindfulness meditation RCT showed lowering of IOP and endogenous cortisol with improvement in quality of life in POAG patients. J Glaucoma December 2018
5. The target IOP for OHT, early-moderate-severe glaucoma based on visual field/optic disc should be well define and preferably a patient example for each should be incorporated to facilitate easy understanding.
6. The section on cyclodestructive lasers needs to be elaborated as micropulse is increasingly being used as part of therapy – more detail and parameters are required.
7. Decision making on what to do if Trabeculectomy fails – Retrab/revision trab versus tube. Sequence – Phaco followed by Trab better than Trab followed by Phaco
8. What to do for blind/visually impaired patients. A small section with low vision therapies /visual field expanders may be incorporated.

Specific Comments

1. The opening paragraph “the goal of care for people “ on page 129 repeated on next page 131
2. Since all glaucoma therapies involve a potential worsening of quality of life, measures to improve quality of life are important and one of the goals of therapy
3. The concept of – “Treat the eye as well as the patient behind the eye” and glaucoma as a “sick eye in sick body” should come in the initial introduction.
4. Page 133 Setting the target IOP. This is a vital section.
   Fixing < 21 for early glaucoma,
   < 18 for moderate glaucoma and < 14 for advanced glaucoma does not seem appropriate to me as if a patient has early glaucoma with VF defect – the target should be $\leq$ 18, moderate $\leq$ 15 and advanced $\leq$ 12 seems more appropriate with < 21 ok for OHT. Early-moderate-advanced should be defined here (visual field/optic disc) and 3 practical examples shown.
5. Page 134 Should we include systemic microvascular disease (Coronary artery disease , cerebrovascular disease, hypertension and diabetes) as factors implicating setting of target IOP / disease progression.
6. Only visual fields are being considered for progression in this section. In OHT and early glaucoma – OCT progression is more important and should be mentioned. If progressive RNFL thinning on OCT consider IOP lowering / reset target IOP
7. Any role of uniocular drug trial (monotherapeutic) – giving drug initialy only in one eye.

8. Should we measure diurnal fluctuation of IOP after starting therapy to get an idea of peak IOP and IOP variation. ? adjust timing of dosage
9. Page 138-140. If IOP > 30 , start with more than one medication. Qualify what is “high IOP”.
10. When giving combination therapy -esp PGA with beta blockers – any relevance of morning versus evening dosage as beta blockers not effective at night .
11. A small note on avoiding beta blockers in LTG may be added.
12. In new drugs Latanoprostene Bunod (nitric oxide addition) to be given. Also add in Figure 3.4
13. Is figure 3.3 really required ? Not much help to reader the way it is (page 141)
14. Table 3.1 PGA. Is travoprost available as 0.003% ? Should we add values of BAK concentration in this table.
15. Table 3.2. Betaxolol is relatively safer for asthmatics / COPD . Mentioned as contraindication similar to timolol. ? mention tachyphylaxis with beta blockers
16. Table 3.3. Allergic to sulpha drugs contraindication to CA inhibitors
17. Table 3.4 Qualify pditatric age for brimonidine (Contra Indicated < 2 years)
18. Page 152 Alternative therapies – Mindfulness meditation has a role in reducing stress and can help to improve QOL and lower IOP.
19. Page 156. A gap of 5 minutes between 2 drops would be more appropriate as compared to 2 minutes.
20. Page 158 LPI. Avoid 12 o clock as air bubble can block site for next laser spot.
    Enlarging the PI horizontally with more shots to reach 200 um is not necessary and can increase complications due to excessive use of energy and pigment release.
21. What about LPI for pigmentary glaucoma ?
22. Page 162. Cyclodestructive Lasers. Need to mention parameters atleast for Diode laser DLCP/Micropulse with technique for probe placement with transillumination of CB and avoiding 3/9 clock hours.
23. Can Elaborate on potential role of micropulse laser in eyes with useful vision and side effects as lot of interest in this technology
24. Indications for Primary Surgery – Patient cannot afford medications
25. Page 170. Using mitomycin C 5 minutes / 0.5 mg/ml is too much
    Do not go beyond 3 minutes and 0.4 mg/ml
26. Interval between cataract and glaucoma filter should be ideally 12 months. Sequence Phaco followed by Trab gives better outcomes than vice versa
27. Visual rehabilitation for blind can be added

A concluding remark about annual life long follow up after glaucoma surgery.

European Glaucoma Society

Review Parul Ichhpuiani (on behalf of WGA)

Review of EGS Guidelines page 11-54 (Epiedemiology, Clinical Trials, Cost Effectiveness) and page 55-92 (IOP, Gonioscopy, ONH/RNFL, Perimetry, Genetics)

Congratulations on a wonderfully drafted, comprehensive guidelines.

Suggestions:

Page 26: Ques 11: Comment: Please add

Page 35: I.6.3: Risk factors for Glaucoma. Risk factors for angle closure maybe added.

Page 38. Figure I.7.1: Suggest addition of Tube Versus Trabeculectomy (TVT) study, Ahmed Baerveldt Comparison Study and the Ahmed Versus Baerveldt Study

Section I.7: Additional reference may be added for:

African Descent and Glaucoma Evaluation Study (ADAGES)

Diagnostic Innovations in Glaucoma Study (DIGS)

Page 58: A Figure showing calibration of tonometer would be good

A comment on how to sterilize the GAT prism

Page 67: Figure II.1.6: Using arrows to aqueous displacement will make the figure easier to comprehend

Page 78: II.1.3.1.7: If you feel appropriate, a comment on Disc Damage Likelihood Scale (DDLS) can be made

Page 85:II.1.4.2.4: May mention Visual Field Index (VFI)

Page 102: II.2.2.1.3: May add Threshold To Treat Calculator, http://oil.wilmer.jhu.edu/threshold

Page 105:II.2.3.1.2: A comment on status of LPI for PG may be added

Michelessi M, Lindsley K. Peripheral iridotomy for pigmentary glaucoma. Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD005655. DOI: 10.1002/14651858.CD005655.pub2.

Page 120: II.2.5.2.1: Can add role of Anti VEGF for NVG

Simha A, Aziz K, Braganza A, Abraham L, Samuel P, Lindsley KB. Anti-vascular endothelial growth factor for neovascular glaucoma. Cochrane Database of Systematic Reviews 2020, Issue 2. Art. No.: CD007920. DOI: 10.1002/14651858.CD007920.pub3.

Page 157: II.3.10.2: Glaucoma Adherence and Persistency Study (GAPS)

Page 163: II.3.12: Parameters for ECP may be added

Page 165: II.3.13.2.1.1: Underneath reference can be added with a comment

Al-Haddad C, Abdulaal M, Al-Moujahed A, Ervin AM. Fornix-based versus limbal-based conjunctival trabeculectomy flaps for glaucoma. Cochrane Database of Systematic Reviews 2015, Issue 11. Art. No.: CD009380. DOI: 10.1002/14651858.CD009380.pub2.

Page 167:II.3.13.2.3: A comment on use of MMC with aqueous shunts may be added

Foo VHX, Htoon HM, Welsbie DS, Perera SA. Aqueous shunts with mitomycin C versus aqueous shunts alone for glaucoma. Cochrane Database of Systematic Reviews 2019, Issue 4. Art. No.: CD011875. DOI: 10.1002/14651858.CD011875.pub2

Looking forward to the final EGS Guidelines.

European Glaucoma Society

Review Jayme Vianna (on behalf of WGA)

Review of EGS Guidelines page 55-92. IOP, Gonioscopy, ONH/RNFL, Perimetry, Genetics

- FCII: I suggest including that eyes with normal anatomy and irregular hyper pigmentation could have other pathologies in addition to pseudoexfoliation. For example, the paragraph on Pigmentation on page 64 mentions uveitis and trauma which can cause irregular hyperpigmentation even without other anatomical abnormalities.
- II.1.3.1.5: I suggest adding that beta parapapillary atrophy is common in myopic and older eyes, and that it can increase with age without representing pathological changes.

- II.1.4.3: I suggest considering presence of central visual field damage as an indicator of severity in addition to MD,

- Fig II.1.6: The differences between the 4 panels is quite subtle. Perhaps it would be clearer if the anterior chamber was deeper, at least centrally.
- Fig II.1.8: The anterior chamber depth (b) is too little on the diagram of eyes with grade 1 or higher, not illustrating the desired b/a proportions

Review Pradeep Ramulu (on behalf of WGA)

Review of EGS Guidelines page 127-171, Treatment of glaucoma

Ending paragraph of p129 – Determining rates of progression is not the standard in all eyes – it is the standard for eyes deemed at low to moderate risk of progression, but one does not need to wait to advance therapy in eyes with strong prevalent risk factors for progression, i.e. recent symptomatic progression or uncontrolled IOP.

P131 last paragraph should note that studies in animals have shown exercise to be a protective therapy, and this is supported by some (but no conclusive evidence). Given the overall health benefits of exercise however, it can be mentioned as a potential adjunctive therapy.

P131. Initial surgery to lower IOP is also increasing an alternative as an early/initial therapy when there is coexistent cataract which, with removal, may improve QoL.

P144-150. I would consider adding to each table a column that describes the optimal concentration/dosing/timing of administration. Alternately, this can be added to text.

P151. The text implies that latanoprost is effective at lowering iop in children. It is in older children, but not in younger children. So while safe, it is best tried in older JOAG kids. LB Enyedi, SF Freedman - Survey of ophthalmology, 2002

P153. IOP tends to decrease in women without glaucoma during pregnancy, but there is less evidence of what it does in the pregnancy of those with glaucoma. In some occasions, it can rise. Belkin, Oph Glaucoma, 2020

P156. It is better said that punctal obstruction may reduce systemic side effects for some medication classes (has only really been shown for beta blockers).

P160. I hesitate to call PAS a complication of ALT is it has been not shown to have any negative consequences and was shown in the Glaucoma Laser Trial to be associated with a greater likelihood of success.

P162. I would not report aqueous misdirection as a complication of cyclodestruction. It has been reported, but these procedures have also been reported as a successful treatment for this condition. As such, I worry that people will get a false worry about the procedure with this listing. RG Carassa, P Bettin, M Fiori… - Archives of …, 1999

P164. A critical factor in the choice/technique of surgery is also the ability / desire of the patient to handle/tolerate adjunctive topical medical therapy after surgery.

P169. Scarring is misspelled in the section heading.

Review Alex Huang (on behalf of WGA)

European Glaucoma Society

Review of EGS Guidelines page 55-92. IOP, Gonioscopy, ONH/RNFL, Perimetry, Genetics

Section 2 pg 56-71.

-Page 62: “Level of iris insertion, both apparent without indentation and true after indentation.”
Is this correct? I’m not sure what “apparent” and “true” are referring too. Do you mean that it is easier to see the exact insertion with indentation because it is more clearly exposed? If that is the case, I would word it more specifically.
-Page 63: In the image of the corneal wedge technique, I do not actually see the anterior and posterior reflections coming together to a point at Schwalbe’s line. It just looks diffuse throughout.
-Page 64: I would clarify the section on TM pigmentation and function. What is written states that non-pigmented TM is non-functioning as opposed to pigmented TM. However, in some individuals, the entire TM is non- or lightly pigmented. In that sense, the wording would imply that such individuals are automatically in trouble. However, as we know, some people just have their entire TM showing poor pigmentation and be normal. In fact, page 63 of this guideline is entirely devoted to examining such patients.
-Page 65: It says that direct gonioscopy can only be performed when a subject is on their back and that indirect gonioscopy can only be performed when a subject is in a slight lamp. This is not true. There are no rules that preclude use of a prism in any particular body position. Also, I don’t understand the statements about simultaneous comparison. With direct gonioscopy, how is it possible to perform “simultaneous comparison of both eyes” as it states? Are we talking about using two prisms (one on each eye) and having the clinician move back and forth between the left and right eyes?
-Page 66: I would specify that the pressure is from the gonioprism lens. Otherwise, it might sound like the phakic lens is providing pressure.
-Page 66: In the figure, there is a blue squiggly line between the ciliary processes of unclear purpose.
-Page 67: The difference between images (3) and (4) is minimal. Maybe add color to the peripheral iris to draw the readers’ attention to the relative positions.
-Page 68: Wouldn’t it make better sense to present gonioscopy “without indentation” before “with indentation.” Currently, it is the opposite.
-Page 68: It’s weird to say that a grading system “stimulates” observers. Instead, it “encourages” observers to use a systematic approach.
-Page 71: The figure makes sense, but I am thinking about a situation where the resolution of the print, the color of the ink, and the size of the page may make it hard to see the b/a ratio on the image. Alternatively, the eyes could be drawn to only show the temporal side (1/2 of the eye), as opposed to the whole eye. In this case, the “region of interest” is zoomed-in upon and expanded to be larger. It may be then easier to appreciate the space difference between the yellow (slit on iris) and blue (slit on cornea) lines on the image.

Review Monisha Pongpiur (on behalf of WGA)

Review of EGS Guidelines page 93-126. Types of Glaucoma

Page 112, Section II.2.4 Angle Closure
II. Anomalies of the ciliary body ("plateau iris"):
Suggest to rephrase the second paragraph in this section.

Original paragraph:
Plateau iris "syndrome" may be differentiated from plateau iris "configuration". Anteriorly positioned ciliary body processes can occur in the presence of pupil block which can obscure the iris profile. Relief of pupil block by LPU may be required to identify the plateau iris. Plateau iris "configuration" refers to a situation in which the iris profile angulates sharply in the periphery, but no irido-trabecular contact is present. "Plateau iris syndrome" refers to a post-laser iridotomy condition in which a patent peripheral iridotomy has removed the relative pupillary block, but gonioscopically apposiotional angle closure persists.

Suggested changes:
Anteriorly positioned ciliary body processes can occur in the presence of pupil block which can obscure the iris profile. Relief of pupil block by LPI may be required to identify the plateau iris. Plateau iris "syndrome" may be differentiated from plateau iris "configuration". Plateau iris "configuration" refers to a pre-iridotomy condition characterized by the presence of gonioscopic angle-closure, flat iris plane and an anterior chamber that is not shallow centrally. "Plateau iris syndrome" refers to a post-laser iridotomy condition in which a patent peripheral iridotomy has removed the relative pupillary block, but gonioscopically apposiotional angle closure persists.

Page 114, Section II.2.4.1 Primary angle-closure (PAC)
The sentence "The absence of identifiable causes defines PAC." Can be omitted

Page 114, Section II.2.4.1.1 Primary angle-closure suspect (PACS) or 'occludable' angle
Aetiology and mechanism: See 2.3.1
Features: See 2.3.1

The sections 2.3.1 refers to "*Secondary open-angle glaucomas caused by ocular disease"* and not to the aetiology and mechanisms of PACS.

Page 115, FC VII-Management of chronic angle closure
Suggest to the remove the boxes 'Pupil constriction (pilocarpine)' from both pupillary block and plateau iris columns. This step is not needed as a separate step. Rather, pilocarpine is instituted prior to an LPI/iridoplasty procedure to induce miosis and stretch the iris stroma.

Page 116, Section II.2.4.1.3 Acute angle closure (AAC) attack due to pupillary block or mixed mechanisms
Features:
- High IOP, often above 40mmHg

- Peripheral iris pushed forward; if possible gonioscopy shows iridotrabecular contact 360^0.

Suggest to change it to 'IOP >21 mmHg[1] (often with high IOP, above 40 mmHg."
Suggest to changes it to 'Peripheral iris pushed forward; if possible gonioscopy shows extensive iridotrabecular contact.

[1]Thomas R, Walland MJ. Management algorithms for primary angle closure disease. Clin Exp Ophthalmol. 2013 Apr;41(3):282-92.

Page 117, Section II.2.4.1.3 Acute angle closure (AAC) attack due to pupillary block or mixed mechanisms

B: Laser and surgical treatment:

Suggest to rephrase the sentence "Surgical irdectomy may be required when Nd:YAG LPI is not possible" to " Surgical irdectomy may rarely be required when Nd:YAG LPI is not possible"

Page 120, Section II.2.5.1 Secondary angle-closure with pupillary block

Features: Suggest to replace "Appositional or permanent ITC," to "Appositional or synechial angle closure,"

Review Verena Prokosch-Willing (on behalf of WGA)

European Glaucoma Society

Review of EGS Guidelines page 11-54. Epidemiology, Clinical Trials, Cost Effectiveness

General Comments: Very structured guidelines and very informative to read. Very relevant questions are asked in the beginning which are graded in terms of evidence and recommendation becoming thus a very useful guideline to be followed in daily clinical practice. Specific comment: Most relevant references for evidence could be quoted even here.
Very relevant summary of the clinical trials putting the most relvant infomations in a nutshell and quoting the most relevant studies. Very appropriate.

- Write general or specific comments making a reference to the page and section
- When possible cite specific evidence to support evidence-based changes to content.

Review Olusola Olawoye (on behalf of WGA)

Review of EGS Guidelines page 11-54. Epidemiology, Clinical Trials, Cost Effectiveness

Congratulations to the reviewers of the EGS guidelines. This is a thorough work and yet simple to read and understand. It is unique with remarkable evidence ratings and it is easy to use as a guide in managing glaucoma patients even in a busy clinic.

Kindly find below very few comments:

Page 31: questions at baseline: history suggestive of recurrent ocular inflammation may also be important

Page 31: Direct Questions at follow up: We may also consider adding a question about side effects of medications. Although there is a question on problems with medications but a more specific question on side effects may be useful. (especially in patients who tend to forget their complaints when they get to the hospital)

Review Simon Skalicky (on behalf of WGA)

P24, Q4 CCT.

It may also be worthwhile stating that CCT should guide target IOPs, eg someone with very thin CCT requires lower target IOPs, and vice versa.

P25 Q7 repeated gonioscopy:

The importance of repeated gonioscopy depends on other factors. For instance, If the patient is pseudophakic or a high myope then repeated gonioscopy is not so important; however for hypermetropes/older phakic individuals, creeping phacomorphic angle closure is a real problem that can result in glaucoma progression despite IOPs being at target; repeat gonioscopy is critical for those.

P31 Glaucoma history:

The evidence is weak/conflicting but it may be worth considering adding the following to the glaucoma history if clinically indicated eg NTG work up:

- Obstructive sleep apnoea
- Vasospastic phenomena eg migraines, Raynaud's phenomenon

P33 bottom paragraph

The *means* of providing information is also important. Eg talking to patients is great, but the stress of first diagnosis might be overwhelming and so much of the information might not be taken in. Hence patient-tailored leaflets, as well as internet-based resources for patients to access later are important – this is where patient support organisations can help. Follow up visits to re-iterate the message either with the primary clinician or practice staff can be used. Also involving carers/family in the discussion can help re-inforce the message and improve adherence with medication and appointments.

1.6.1 Line 4.

Minor point, but is it possible not to use future estimation for 2020 prevalence, as it is no longer in the future.

1.6.4

Perhaps a brief few sentences of some strategies to help improve the under- and over-diagnosis of glaucoma

Sections 1.7-1.9: no changes to recommend