Focus on Glaucoma

Pearls from the AGS 2018 and the ASCRS 2018

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Many interesting themes were discussed in the two meetings of the American Glaucoma Society (AGS) 2018 (March 1-4) and the American Society for Cataract and Refractive Surgery (ASCRS, April 13-17) 2018. Hence I would like to share clinically important pearls:

1) **MIGS**
2) **New glaucoma medication and drug delivery systems**
3) **«Essentials» in glaucoma**
4) **PACS and surgical treat ments**
5) **Costs and Adherence**

1) MIGS

Each minimally invasive glaucoma surgery (MIGS) procedure falls into one of four categories, depending on its effect: MIGS can decrease the aqueous production, improve the conventional pathway, open the supraciliary space or connect to the subconjunctival space.

The trabecular micro-bypass stents were often discussed. The longest study duration was five years. In the US, the first generation of iStents® and since very recently also the second generation, the iStent inject®, have gained FDA approval.

The main questions raised in the talks:

- What is the amount of the intraocular pressure (IOP) lowering?
- Is there a difference if it is used as a stand-alone procedure or in a combination with a cataract operation?
- Should we implant one or multiple stents?
- How do the results of iStents® compare to other MIGS?

All speakers agree that iStents® reduce the IOP consistently during five years (15 – 35 %) and that the IOP lowering effect is greater in combination with phako. Two stents seem to work better than one stent, but more are not recommended. Only one study compared directly one iStent® and a dual blade goniotomy.The goniotomy lowered the IOP more than one stent.

The supraciliary stent (CyPass®), which is approved in the US in connection with phacoemulsification and not as a stand-alone procedure, lowers the IOP in the range of the suprachoroidal pressure. There is often a myopic shift of these eyes due to an effective lens positioning change. Risk factors for these changes (which mainly resolve over time) are a low preoperative IOP and an extreme axial length.

The third FDA approved stenting system is an ab interno applied subconjunctival gel microshunt (Xen®).

The optimal type of MIGS should be selected by staging the disease and looking at the patients' morphology: In severe glaucoma (or after a not successful selective Laser Trabeculoplasty), the outflow channels are often obliterated and a MIGS which uses the natural outflow is less effective than one connecting to the subconjunctival space. However, if the conjunctiva is scarred after years of local antiglaucomatous therapy, a MIGS accessing the supraciliary space should be considered.

2) New glaucoma drugs and delivery systems

More than 20 years after the last introduction of an antiglaucomatous drug (prostaglandin analogues) a new class of drugs was approved by the FDA: The Rho-kinase inhibitor Netarsudil. The exact mechanism of action is still unknown but it is assumed to increase the trabecular outflow. The extent of IOP lowering is non-inferiority to Timolol without systemic side effects and it is also effective in low level IOP values at start.

An interesting product, which is still in the study phase, is a combination of four different classes of antiglaucomatous drugs. This maximal medical therapy could be applied with one bottle which potentially ameliorates adherence.

Two different prostagladin implants (Travoprost and Bimatoprost) to lower the IOP for many months are studied in different clinical settings. They will probably allow a sufficient IOP lowering for up to about six months.

3) «Essentials» in glaucoma

It is always interesting to apply useful abbreviations and the speaker of this session at ASCRS managed to teach new facts about old examination techniques.

Some pearls:

a) An easy help to remember the secondary open angle glaucomas:
«LITE D PIP(E)» or:
«L»ens induced glaucoma
«I»nflammatory glaucoma
«T»rauma
«E»levated episcleral venous pressure (EVP)
«D»rugs
«P»seudoexfoliation
«I»ntraocular tumours
«P»igmentary glaucoma

It is crucial to ask the patients about complementary alternative products they might be taking, because they could contain traces of atropin and scopolamine and possibly induce an acute angle closure attack because of mydriasis.

b) The most important aspect of judging a visual field is the foveal sensitivity (FS): FS is not affected by cataract, but reduced in case of central diseases (a patient with a macular hole has a FS of zero with an otherwise normal visual field).

c) Gonioscopy is the most important examination in deciding which MIGS can be used. The shape of the cornea plays an important role in the correct judgment of IOP: In corneal edema, one would assume that given the thicker cornea, the measured IOP should be lower than the «real» intraocular pressure. The opposite is true: In corneal edema, the cornea is soft and easily ➜

flattened, leading to an underestimation of the true IOP.

d) What came first: The chicken or the egg? The question arises over and over again: which parameter changes first, the visual field or the morphology of the optic nerve head? Studies have shown that the chicken (visual field) was there first. Other studies proved that it is patient dependent which parameter progresses first. Both examinations are necessary during the follow-up of a glaucoma patient.

e) In the management of patients it is essential to transmit and emphasize hope, not fear, because fear negatively influences the attitude and also the adherence of patients to therapy.
I would like to finish my summary with the phrase of Dr Brown: «Nothing frightens a patient more than a doctor who is afraid» and emphasize the importance of a continuous communication between doctor and patient.

4) Should a patient with PACS get a surgical treatment?

The angle closure disease is staged according to the severity of the disease in Primary Angle Closure Suspect (PACS), Primary Angle Closure (PAC) and Primary Angle Closure Glaucoma (PACG).
In PACS, the trabecular meshwork is at risk by an apposition of the iris in more than 180°, in PAC the trabecular meshwork is dysfunctional, and in PACG the optic nerve head shows signs of glaucomatous damage.
Studies have shown a transition from PACS to PAC in 22 % within 5 years and transition from PAC to PACG in 28 % respectively. In the daily practice we see often patients with PACS and discuss an eventual surgical treatment.
Of high interest is the risk of an acute angle closure attack (APAC) after an examination with dilated pupils. Studies showed an incidence of 0.64 % in angle closure suspects (Singapore), of 1.3 % in narrow angles (Rotterdam) and of 0 % in occludable angles (Baltimore Eye Survey). If the risk of an APAC in an asymptomatic patient with PACS is 1 %, we need to treat 99 patients with laser iridotomy (LIT) to prevent one acute attack. Therefore it is recommended to treat only high risk patients with a LIT and consider the risk factors: family history of PACG/APAC, often needed dilation exams for example in diabetes, poor follow-up and uncertain access to emergency ophthalmic care.

5) Costs and adherence

Some facts of interest for the discussions about costs in ophthalmology:

- Half of the world's ophthalmologists live in 6 countries: Brazil, China, India, Japan, Russia, and the US
- In the US there is one ophthalmologist for every 10'000 inhabitants
- In Ghana, the ratio is 1 : 500'000 (Resnikoff S et al. 2012).
- In Switzerland, the ratio is 1 : 8'500 (Swiss statistics 2015).

Another aspect of costs is the affordability of a drug and its influence on adherence: As a lifelong therapy of glaucoma is needed, an affordable treatment enhances and a not affordable treatment decreases adherence. This issue is even more important in developing countries where about 70 % of the glaucoma patients live. An affordable drug uses per definition ≤ 1 % of the Median Annual Household Income (MA-HHI) and a not affordable drug ≥ 1 % of the MA-HHI. Timolol was the most affordable antiglaucomatous drug tested, however, it was not affordable for patients in 9 out of 37 countries worldwide. Hence analogues (a latanoprost generic) were not affordable in 23 out of the 37 countries tested in a study (presentation of B. Stagg at the AGS 2018).
Therefore, other therapeutic options which reduce the costs and enhance the adherence are necessary for a cost-effective glaucoma management. •

References
AGS 2018 and ASCRS 2018 program and abstract books

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