A systematic review and meta-analysis of outcome in minimally-invasive glaucoma surgeries

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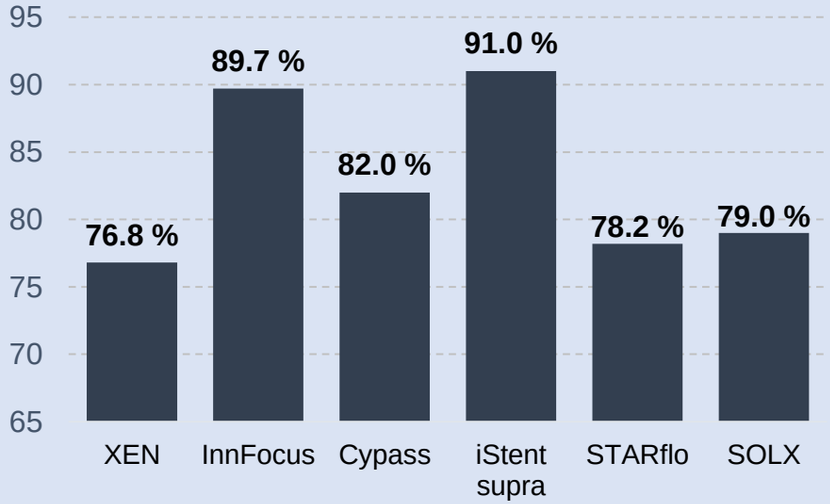
Purpose

We have investigated the cumulative reported change in intraocular pressure (IOP) and glaucoma medications using different subconjunctival and suprachoroideal minimally-invasive glaucoma surgeries (MIGS) devices (XEN, InnFocus, Cypass, iStent supra, STARflo, SOLX) as a solo procedure or in association with phacoemulsification.

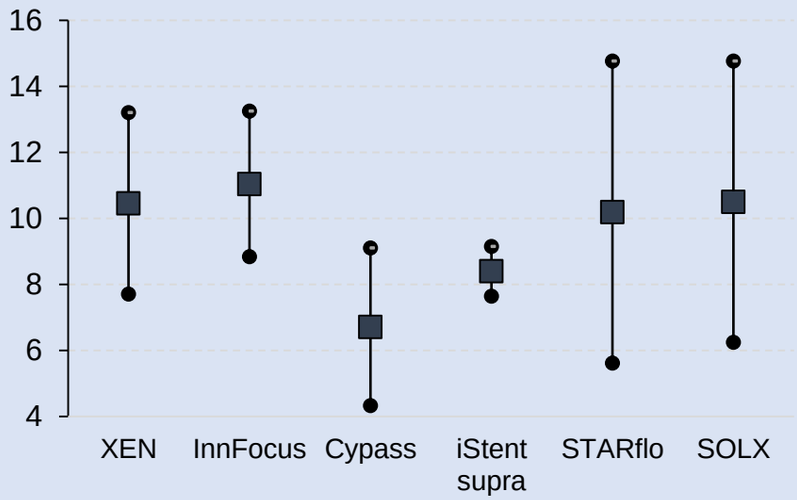
Methods

A systematic literature search was performed to identify randomized control trials (RCT) and non-RCT (non randomized comparative studies, NRS, and before-after studies) with at least 12 months of follow-up in patients affected by primary open angle glaucoma, pseudoexfoliative glaucoma or pigmentary glaucoma. Outcome data regarding overall qualified response (OQR), IOP, and number of glaucoma medications at 12 months were extracted from the published sources and compared across all devises to baseline characteristics.

Overall qualified response (OQR) at 12 months



Observed mean IOP difference at 12 months (95% CI)
(Continuous Random-Effects Model)



Results I

A total of 30 studies were identified (2 RCT and 27 NRS) which included 2.289 eyes. Main concerns about risk of bias comprised lack of appropriate control arms and small numbers of analyzed eyes. Only 6 series have reported outcome data for more than 100 eyes (median 54 eyes, range 7-374). However, MIGS surgery seemed effective in lowering both IOP and glaucoma drug use at 12 months with a reported OQR ranging between 76.8% and 91.0%. MIGS showed a good safety profile: IOP spikes were the most frequent complications and no cases of infection or BCVA loss due to glaucoma were reported.

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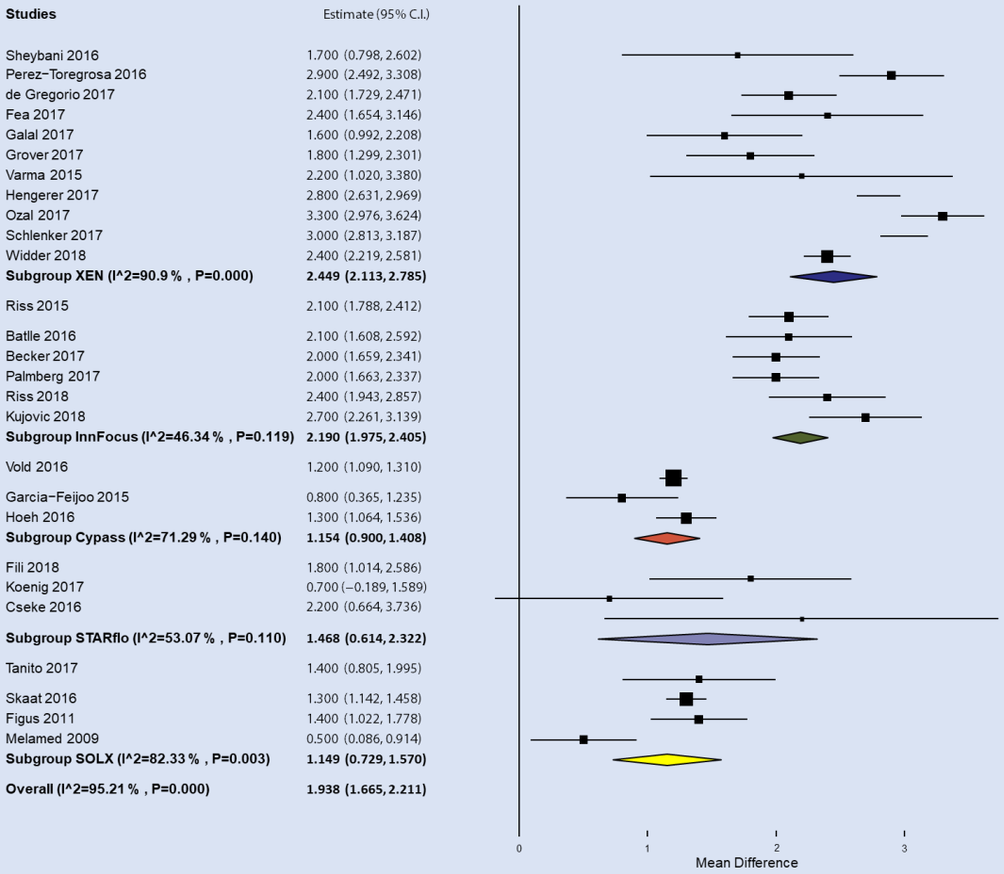
Meta-analysis of observed mean difference in medication at 12 months (Continuous Random-Effects Model)



Results II

Stratified meta-analysis of observed mean IOP difference at 12 months revealed the highest mean IOP reduction at 12 months for the Innfocus device (11.049), followed by the SOLX (10.545) and XEN device (10.464). Efficacy of the STARflo device was in a similar range (10.269), whereas iStent supra and Cypass showed much lower IOP reduction at 12 months (8.400 and 6.718). The change in the number of glaucoma medication was highest in the studies which used the XEN and InnFocus device (2.449 and 2.190 contrasting the suprachoroideal devices.

Conclusions

MIGS show in general a good safety profile and effective reduction of IOP and glaucoma medication, however, the evidence on the efficacy of MIGS compared to other therapies is still limited and is based on few RCTs of acceptable quality and a larger number of NRS and uncontrolled before/after series. The remarkable heterogeneity of the analyzed series suggests the need for additional research to understand how to maximize the utility of these new procedures, in particular by performing more RCTs.

Disclosures

No conflicts of interest.

References

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