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Micro-invasive glaucoma surgeries. Are they worth it?

Cirurgias micro-invasivas do glaucoma. Vale a pena?

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The technical difficulties and potential risk of complications of filtering surgeries partly explain why surgical reccommendation is usually left to cases where clinical or laser treatment failed. This paradigm is probably inadequate for the treatment of glaucomatous optic neuropathy. Earlier surgical intervention would save the ocular surface, reduce costs in the long term, and solve the problem of poor adherence to eye drops.(1)

This need led to the search for better tolerated surgical techniques with a higher safety profile. Micro-invasive glaucoma surgery (MIGS) propose to fill this gap: glaucoma surgery to be performed earlier in the disease continuum.

MIGS is an English acronym for Micro-Invasive Glaucoma Surgery or Minimally Invasive Glaucoma Surgery. The Micro-Invasive version is preferred by most authors recently. MIGS actually corresponds to a group of surgical procedures aimed at improving the safety and predictability of surgical treatment of glaucoma.(1-3) These procedures mostly avoid, or limit in some cases, conjunctival manipulation. They have some characteristics in common:(1-3) the internal ab approach; little traumatic approach; proven efficacy; high safety profile, and fast visual recovery.

The efficacy and safety studies of most MIGS do not compare to traditional filtering surgeries, despite the guidelines and recommendations of the World Glaucoma Association.(4) The fact that MIGS are commonly associated with cataract surgery makes comparisons difficult.

If MIGS is generally less effective than filtering techniques (which remains to be proven!), the rarity of its complications and its excellent safety profile have greatly improved the benefit/risk ratio.(3) It allows the indication of MIGS to be made at earlier stages of glaucoma, where the pressure target to be reached is not as demanding as in very advanced glaucomas. The advantages would be clear: IOP consistently controlled in 24 hours, decrease in the amount of drops per day with all its advantages (less impact on quality of life, decrease in long term costs, and less impact on the ocular surface), improved adherence to treatment, high safety profile.(1,3)

MIGS can be classified according to their mechanism of action. There are those who propose to facilitate the flow of aqueous humor drainage by conventional means (trabecular, Schlemm's canal and collector channel), performing a trabecular ablation such as trabeculotomy techniques (Trabecutome®, ABIC®, and GATT® Kahook Dual Blade®) or a trabecular by-pass with device implant (iStent®, iStent Inject® or Hydrus®). Others provide suprachoroidal drainage such as iStent Supra® and CyPass®. A third group of techniques create a new subconjutnival drainage pathway through direct communication between the anterior chamber and the subconjunctival space (XEN gel Stent® or InnFocus®).(1,3)

The micro-invasive glaucoma surgery (MIGS) requires the selection of appropriate cases to get the most expected result. Not all types of MIGS have the same indications and contraindications. However, it is necessary to evaluate the correct indications of the different MIGS techniques within the reasoning of the treatment of glaucoma. (1,3)

MIGS are classically indicated for primary or secondary open-angle glaucomas, and are often indicated in association with cataract extraction surgery. They are contraindicated in narrow-angle or closed-angle glaucoma, and neovascular glaucoma. (1,3)

In Brazil, the MIGS with greater penetration among surgeons are those making a trabecular by-pass through the use of iStent® or iStent Inject® implants (Glaukos Inc., San Clemente, USA). They were the first MIGS techniques to be approved for use in the Brazilian population (2017 for iStent, and 2018 for iStent Inject).

The initial results in the Brazilian population with these trabecular bypass techniques are quite promising, leading to significant blood pressure reduction.(5) Guedes et. al. analyzed the cases in which they used iStent or iStent Inject in association with cataract surgery within 6 months of follow-up. From a similar intraocular pressure (IOP) in the preoperative period (16.5 mmHg in the iStent group, and 17.3 mmHg in the iStent Inject group), patients reached the end of 6 months with significantly lower IOPs (13.9 mmHg and 12.7 mmHg, respectively in the iStent or iStent Inject groups). All patients in the iStent Inject group (model with two implants in the same injector) achieved a final IOP of less than 18 mmHg, whereas in the iStent group (single implant model) 86.8% achieved this level of IOP. (5)

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The reduction in average number of eye drops per patient was also significant. On average, there was a reduction of 1 to 2 eye drops per patient during the follow-up period, reaching approximately 70% of patients without the need of glaucoma eye drops at the end of 6 months. [5]

MIGS will be increasingly used in Brazil both by glaucoma surgeons and cataract surgeons, thus allowing to increase the options of the surgical treatment of open-angle glaucoma to the earliest stages of the disease. This will allow for a paradigm shift in the treatment of glaucoma, and perhaps help preventing glaucoma from progressing to more advanced stages. It is expected that a more effective blood pressure control (with surgery) earlier in the history of the disease can prevent more serious cases in the future, thus avoiding the need of more invasive and riskier surgeries. In addition to robust clinical evidence and speculation about the impact of using MIGS for glaucoma progression in the future, there is data available suggesting that the use of MIGS would be more cost-effective. A study carried out in Colombia showed that iStent use in surgeries combined with cataract (related to the use of Timolol Maleate 0.5% eye drops, when needed) was the most cost-effective alternative compared to laser trabeculoplasty or different prostaglandins (associated with the use of a fixed combination of Timolol Maleate 0.5% and Dorzolamide Hydrochloride 2%, when needed).[6] Another study carried out in Canada compared the use of iStent Inject (isolated use without being associated with cataract surgery) to the use of different combinations of medications for the treatment of open-angle glaucoma.[7] In said study, iStent Inject was the most cost-effective and fully dominated alternative, that is, the cheapest and the most effective from the perspective of the public health system and in a period of 15 years.[7] The device was only completely dominated from the 4th year follow-up. Before that, the device was not cost-effective.[7] Studies like these show the true impact that this type of surgery can have, not only for the individual but also for the community and health systems, avoiding direct medical costs, direct non-medical costs, and future indirect costs.

Given what MIGS offers and what the results attest, there is room for these techniques to be used safely and effectively. Therefore, it is worth going deeper on the theoretical and practical knowledge of these innovative surgical techniques.

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