

Commentary: Needle goniotomy in adults: Is it a viable minimally-invasive glaucoma surgery option?

Goniotomy, needle or otherwise, first described by Barkan,^[1-3] is an effective treatment option in the management of trabeculodysgenesis commonly seen in congenital glaucoma. It appears to have sown the seeds of a group of surgeries now known as minimally invasive glaucoma surgery (MIGS) as it is an ab-interno procedure delivered via intraoperative gonioscopy achieved by a small incision and associated with minimal complications. Of course, a major prerequisite in congenital glaucoma is corneal clarity; however, several authors have overcome this with the use of an endoscope.^[4,5] The latter gives reasonable results, as has been my personal experience too. However, the use of goniotomy, or even ab-interno trabeculotomy, effected by various MIGS procedures and devices, has only been a recent phenomenon in adults as over the decades, the validity of the procedure in adult glaucoma in the absence of trabecular dysgenesis has been the dominant concern.

The authors of the current study^[6] have provided some evidence to this effect in a prospective case series, wherein needle goniotomy was done in mild-to-moderate primary open-angle glaucoma (POAG) and pseudoexfoliation glaucoma (PXF) and also high-risk ocular hypertension (OHTN) eyes that had visually significant cataract. Not only did it prove to be effective in the reduction of intraocular pressure (IOP) by 32.1% and topical anti-glaucoma medications (AGM) by 50% at 6 months compared to baseline but was also a safe procedure. Although it is a prospective case series, there are several limitations; the most important ones are the lack of a control group (cataract surgery alone) and the short follow-up. The authors have warranted further follow-up where the latter is concerned, but in the context of a control group, they have cited several reports of clinically insignificant reduction of IOP after cataract surgery alone in POAG eyes. This argument does hold true as multiple authors over the years,^[7,8] as well as several systematic reviews and meta-analysis^[9,10] of the same, have validated that there is a very small reduction of IOP in POAG eyes; therefore, cataract surgery alone is unlikely to replace IOP-lowering surgery.

However, there is a retrospective comparative study by Kim *et al.*^[11] on eyes that underwent conventional goniotomy during cataract surgery and those that underwent cataract surgery alone. This study showed a significantly greater reduction in IOP and AGM in the former group at 1 year after surgery, with similar favorable safety profiles in both groups.

The flip side is that goniotomy may result in a limited IOP-lowering effect according to the level of episcleral venous pressure or it may be subject to the same issues of fibrosis and scar formation in the area of the incision of the trabecular meshwork (TM) as demonstrated by authors in ab-externo trabeculotomy.^[12,13] The authors of the current study found no change in the appearance of the TM in almost 72% of all eyes. They have suggested that large micropores may be created by the procedure and that this may be the reason for continued outflow and IOP lowering despite apparent re-fusion of trabecular leaflets in these eyes.

Therefore, it may be prudent to employ another cost-effective procedure called bent needle an-interno goniotomy (BANG). It utilizes a needle to de-roof the Schlemm's canal (SC) versus just incising the TM in one quadrant (typically nasal) to lower IOP in a manner that is analogous to the one effected either by the Trabectome (NeoMedix Corporation, CA, USA) or the disposable Kahook Dual blade (New World Medical, CA, USA). Both incur a cost; the former needs capital expenditure for the machine as well. Not much data is available in BANG yet, but a study has reported a significant reduction across all severity of glaucoma with a minimum goniotomy of 30°.^[14]

A word of caution is necessary here: steroid response comes much more into play in angle procedures as the TM is still very much in contemplation and in "action" compared to the "bypass" procedures of trabeculectomy (trab) and glaucoma drainage devices (GDD). This is evident in the current study in the form of the highest IOP being recorded at 1 month.

Thus, needle goniotomy (or even BANG) may be a viable first step when a glaucoma procedure is indicated in mild-to-moderate glaucoma patients in the presence of visually significant cataract and when surgery is contemplated. Conventional and invasive surgical intervention for glaucoma (especially trab) can still be performed in such eyes if required in the future as the conjunctiva remains unscathed. These procedures not only help to circumvent the issues of under filtration, over filtration, leak, and infection, which are serious complications of the invasive procedures, but also require shorter operating time, resulting in rapid recovery and early visual rehabilitation without need for increased frequency of postoperative visit/s. These two procedures are cost-neutral and possibly much more acceptable and worthwhile in the context of low-to-middle-income countries vis-à-vis the expensive devices available in the western countries. However, none of these procedures are relevant in angle-closure disease unless the angle opens post laser peripheral iridotomy. Furthermore, none of the MIGS procedures or devices can be accomplished if the skill of intraoperative gonioscopy with a direct gonioscope at high magnification is not acquired. Also, patient as well as microscope positioning for such procedures is a deviation from the norm, which can be an anathema for most.^[15,16]

On the face of it, however, combining goniotomy with cataract surgery in adult mild-to-moderate POAG eyes is a reasonable and safe option, not only for reduction in IOP but also to scale down the burden of AGM, though it is fair to say that stacks more evidence is necessary.

Disclosures

Vanita Pathak-Ray – Santen, Novartis/Alcon, Allergan (Nil relevant).

Vanita Pathak Ray

Department of Glaucoma, Centre for Sight,
Hyderabad, Telangana, India

Correspondence to: Dr. Vanita Pathak Ray,
Centre for Sight, Road No 2, Banjara Hills,
Hyderabad - 500 034, Telangana, India.
E-mail: vpathakray@gmail.com

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