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TANITO MICRO HOOK

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Publications

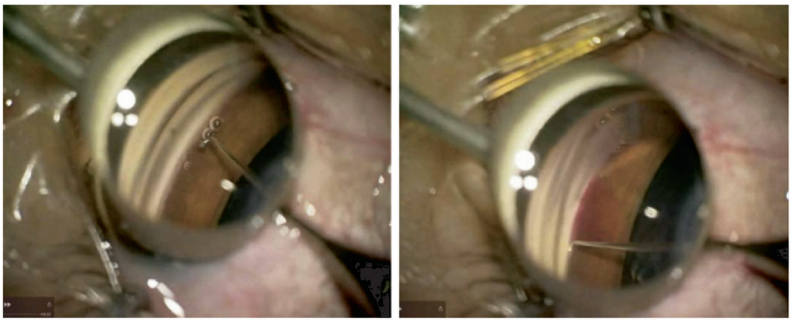
Characteristics, surgical techniques

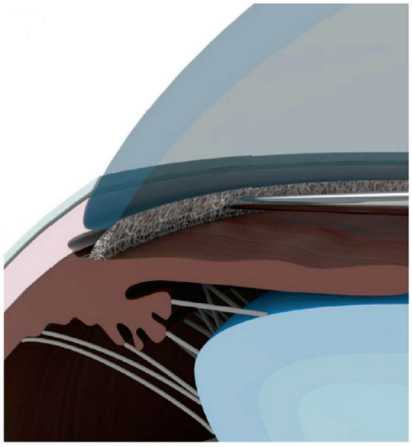
1. Microhook ab interno trabeculotomy, a novel minimally invasive glaucoma surgery

Masaki Tanito/Division of Opthalmology, Matsue Red Cross Hospital, Matsue, Japan

Clinical Ophthalmology 2018:12 43-48,

Trabeculotomy (LOT) is performed to reduce the intraocular pressure in patients with glaucoma, both in children and adults. It relieves the resistance to aqueous flow by cleaving the trabecular meshwork and the inner walls of Schlemm's canal. Microhook ab interno LOT (μLOT), a novel minimally invasive glaucoma surgery, incises trabecular meshwork using small hooks that are inserted through corneal side ports. An initial case series reported that both μLOT alone and combination of μLOT and cataract surgery normalize the intraocular pressure during the early postoperative period in Japanese patients with glaucoma. Microhook can incise the inner wall of Schlemm's canal without damaging its outer wall easier than the regular straight knife that is used during goniotomy. Advantages of μLOT include: a wider extent of LOT (two-thirds of the circumference), a simpler surgical technique, being less invasiveness to the ocular surface, a shorter surgical time than traditional ab externo LOT, and no requirement for expensive devices. In this paper, the surgical technique of μLOT and tips of the technique are introduced.



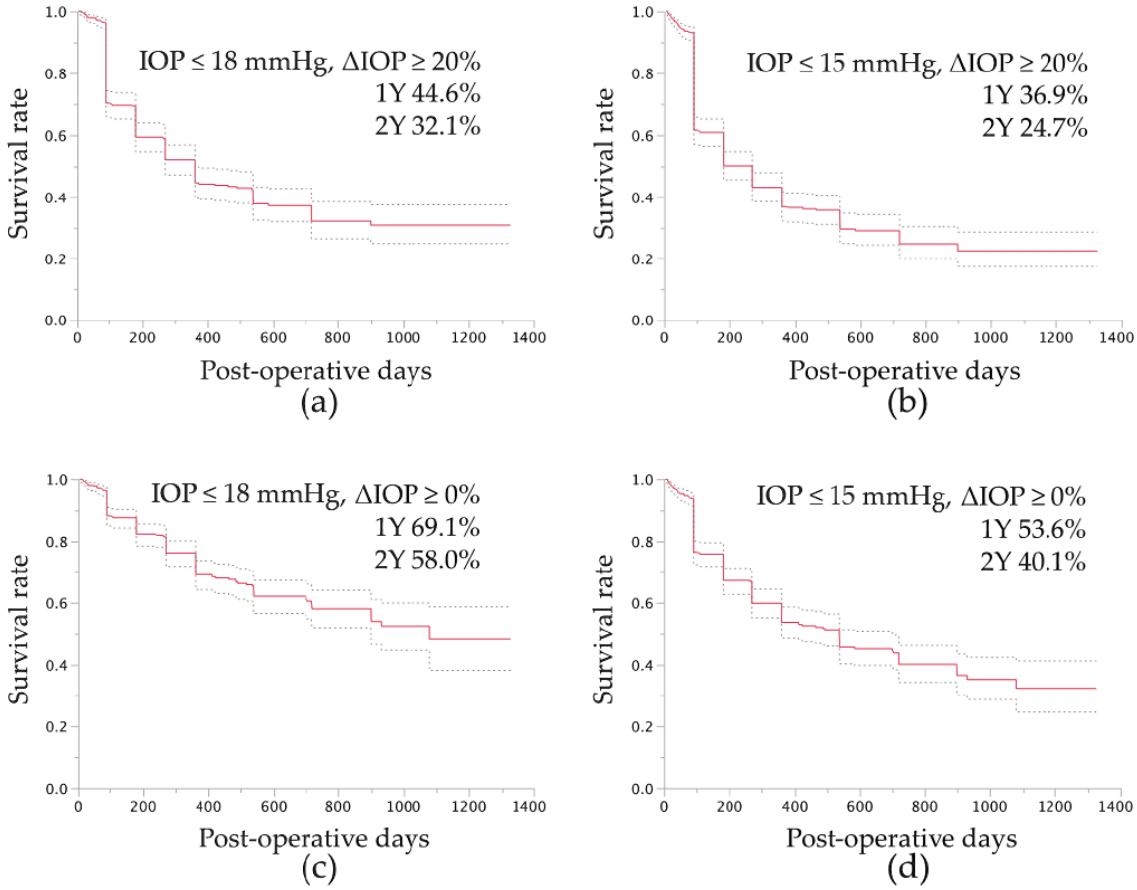


Effectiveness

2. Midterm Results of Microhook ab Interno Trabeculotomy in Initial 560 Eyes with Glaucoma

Masaki Tanito, Kazunobu Sugihara, Aika Tsutsui , Katsunori Hara , Kaoru Manabe ,Yotaro Matsuoka

Journal of Clinical Medicine 2021, 10, 814



IOP lowering effect
IOP ≤ 18mmHg, 58% / 2yrs.
IOP ≤ 15mmHg, 40% / 2yrs

The paper concludes that LOT has a significant IOP-lowering potential in patients with glaucoma, and improves visual function when combined with cataract surgery

3. Early Outcomes of Combined Phacoemulsification and Ab Interno Tanito Microhook Trabeculotomy in Open-Angle Glaucoma

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Ophthalmology Glaucoma 2023; 1-8 by the American Academy of Ophthalmology

Minimally invasive glaucoma surgery (MIGS) is emerging as a popular choice in the surgical management of glaucoma, which confers a modest intraocular pressure (IOP) lowering as well as a reduction in antiglaucoma medication (AGM) burden with a more favorable safety profile compared with traditional glaucoma surgeries.
The safety of MIGS procedures is the key appeal, especially when compared with the traditional filtering surgeries.
Most MIGS procedures act via the trabecular meshwork (TM), suprachoroidal space, or the ciliary body.
The basic premise of these MIGS procedures is to preserve the conjunctiva for future filtration surgeries and spare the patient from conjunctival or scleral incisions, filtering blebs, and potential subconjunctival wound modulation woes.
The question that is currently being debated is whether to preserve or remove all of the TM. Gonioscopy assisted transluminal trabeculotomy (GATT) is considered minimally invasive, it opens 360 degrees of the TM and other forms of ab interno trabeculotomy may destroy the active aqueous pump within TM-SC complex. It is conceivable that a more limited trabeculotomy may offer a balance between IOP reduction and preservation of the TM tissue.

The aim of this study is to prospectively evaluate the surgical outcomes of combined phacoemulsification with microhook ab interno trabeculotomy
In patients with POAG and visually significant cataract

Procedure : Patients were divided into 2 treatment arms; group 1 included
patients who underwent combined phacoemulsification with ab interno Tanito microhook trabeculotomy (microLOT) and group 2 included patients who underwent phacoemulsification alone.

The baseline characteristics were similar between the 2 groups, except the number of AGMs, which was greater in group 2. The mean preoperative IOP for group 1(phaco-microLOT) was 26.5 mmHg and group 2 (phaco-alone group) was 25.3 mmHg which decreased to 12.5 mmHg and 20.0 mmHg at 12 months, respectively. Logarithm of the minimum angle of resolution visual acuity improved from 0.48 (interquartile range [IQR], 0.30e0.60) preoperatively to 0.00 (0.00e0.18) postoperatively ($P < 0001$) in group 1 and improved from 0.30 (IQR, 0.30e0.48) to 0.00 (0.00e0.00) in group 2 ($P < 0.001$). In group 1, the mean (standard deviation [SD]) AGM used preoperatively was 0.6 (0.9) which was significantly reduced to 0.2 (0.5) at 12 months postoperatively, whereas in group 2,at 12 months, the mean (SD) AGM used was reduced from 1.4 (0.6) to 1.1 (0.9). In group 1, 90.3% of eyes achieved complete success at the end of 1 year. The most common complication was hyphema, noted in 4 patients with 1 eye requiring an anterior chamber washout.
Ab interno microhook trabeculotomy (microLOT) combined with phacoemulsification in patients with open-angle glaucoma is an efficacious procedure with relatively minimal complications.

Figure 1

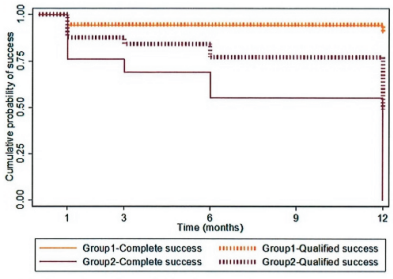


Figure 2

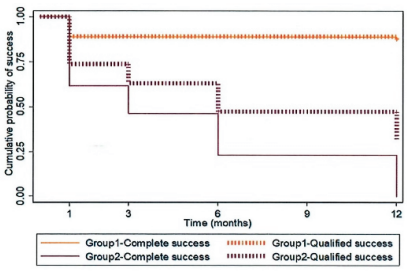


Figure 1 shows Kaplan-Meier survival plot showing the cumulative probability of complete(without AGM) and qualified success(with some or a few AGM) as IOP less than or equal to 18mHg and Figure 2 shows the cumulative probability of complete ad qualified sucesss as IOP of less than or equal to 15mHg.

Comparison with other techniques or devices

4. NonInferiority of Microhook to Trabectome

Trabectome versus Ab Interno Microhook Trabeclotomy Comparative Study (Tram Trac Study)

Sotaro Mori, MD, PhD,Masaki Tanito, MD, PhD,Nobuyuki Shoji, MD, PhD,Yu Yokoyama, MD, PhD, Takanori Kameda, MD, PhD, Takuhei Shoji, MD, PhD, Shiro Mizoue, MD, PhD, Yuta Saito, MD, PhD, Kyoko Ishida, MD, PhD, Toshihiko Ueda, MD, PhD,11 Makoto Nakamura, MD, PhD,1 for the TramTrac Study Group*

Ophthalmology Glaucoma 2022;5:452-461 ª 2021 by the American Academy of Ophthalmology

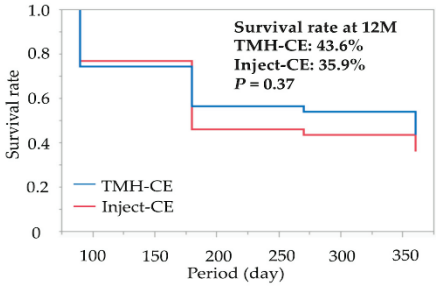
Purpose: To elucidate the noninferiority of ab interno microhook trabeculotomy (mTLO) using a recently developed reusable stainless spatula-type microhook device to incise the trabecular meshwork to Trabectome (Neomeix, Inc) surgery in terms of the the 1-year postoperative outcomes of Japanese patients with glaucoma by means of propensity score analyses. The primary outcome was surgical success at 1 year after surgery. We defined surgical success as satisfying all 3 criteria: (1) IOP within 5 to 21 mmHg, (2) IOP reduction of 20% or more from preoperative IOP, and (3) no additional glaucoma surgery.
Results: The 95% confidence interval of risk difference of surgical failure in mTLO in reference to Trabectome surgery was minus12.1% to 9.5% ini matching, minus12.7% to 11.1% in IPTW, minus12.2 to 7.0 in stratification, and minus 9.7% to 8.1% in regression adjustment, all of which fell within the predetermined noninferiority margin of 15%. Surgical success of mTLO at 1 year after was not inferior to that of Trabectome surgery.

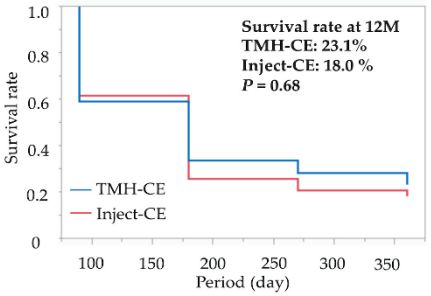
5. Fellow-Eye Comparison between Phaco-Tanito Microhook trabeculotomy and Phaco-iStent InjectW

Akiko Harano, Ayaka Shimada, Sho Ichioka, Kazunobu Sugihara and Masaki Tanito

Journal of Clinical Medicine 2023,12,7005

This study aims to compare the surgical efficacy and safety of the Tanito microhook trabeculotomy (TMH-CE) and iStent inject W (Inject-CE) when performed in combination with cataract surgery on the eyes of glaucoma patients. A total of 78 glaucomatous eyes from 39 participants were retrospectively analyzed.





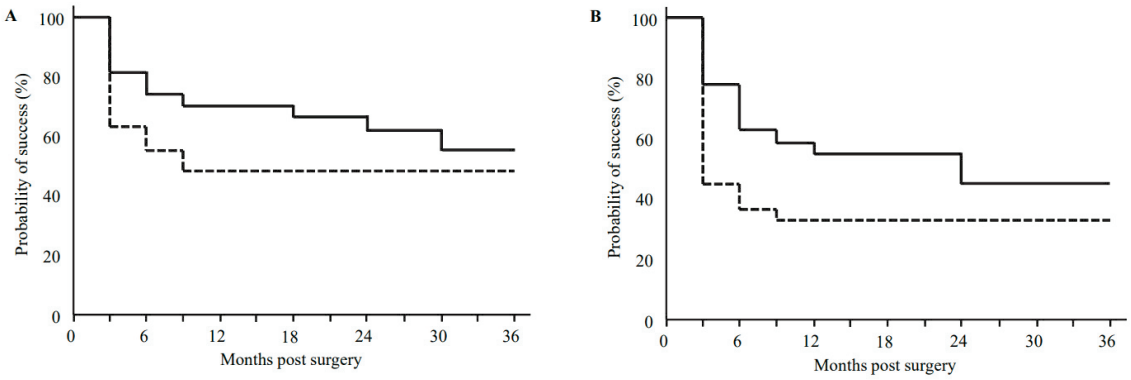
Survival rate at 12M for Tanito Micro Hook was 43.6%, while the rate for Inject W was 35.9%.
The paper concludes that the amount of IOP reductionas well as the amount of medication number reduction achieved with the TMH were greater than with the iStent inject when both were combined with cataract surgery.

6. Comparison of Mid-Term Outcomes between Microhook abInterno Trabeculotomy and Goniotomy with the Kahook Dual Blade

Naoki Okada, Kazuyuki Hirooka, Hiromitsu Onoe, Hideaki Okumichi, Yoshiaki Kiuchi

Journal of Clinical Medicine 2023.12.55

This study retrospectively examined the mid-term surgical outcomes between microhook ab interno trabeculotomy (LOT) and goniotomy when one was using the Kahook Dual Blade (KDB) in combination with phacoemulsification in primary open-angle glaucoma and exfoliation glaucoma patients. Between December 2016 and December 2020, the current study examined 47 LOT and 52 KDB eyes that underwent surgery. When there was a < 20% reduction in the preoperative intraocular pressure (IOP) or when the IOP was > 18 mmHg (criterion A), the IOP was > 14 mmHg(criterion B) at two consecutive follow-up visits, or when there was a requirement for reoperation, these were all considered to indicate that the surgery failed. The results for both of the groups show there were significant postoperative reductions in the IOP ($p < 0.05$) and medication scores ($p < 0.05$) at 6, 12, 24 and 36 months. At 12, 24, and 36 months, the probabilities of success in the LOT and KDB groupsfor criterion A were 70.4% and 48.2%, 61.9% and 48.2%, and 55.0% and 48.2% ($p = 0.32$; log-rank test),respectively. For criterion B, the results for the two groups were 55.6% and 33.3%, 44.4% and 33.3%,and 44.4% and 33.3% ($p = 0.15$; log-rank test), respectively.



Similar postoperative complications were found between the groups. Comparable mid-term surgical outcomes were found for the uses of μLOT and KDB.

7. Mid-Term Surgical Outcomes of T-Hook, 360° Suture Trabeculotomy, Kahook Dual Blade, and Tanito Microhook Procedures: A Comparative Study

Etsuo Chihara and Tomoyuki Chihara

J. Clin. Med. 2025, 14(13), 4610;

To compare the three-year surgical outcomes among the Kahook dual blade (KDB), Tanito microhook (TMH), T-hook, and 360° suture trabeculotomy (S-lot) cohorts. Study design: Retrospective interventional comparative study conducted at a single eye center. Subjects and Methods: A total of 224 eyes that underwent combined cataract surgery with either KDB, TMH, T-hook, or S-lot procedures were retrospectively analyzed over the three-year period. Results: According to Tukey's multiple comparison test, postoperative intraocular pressure (IOP) in the S-lot cohort was significantly lower than in the TMH cohort from 1 month to 3 years ($p = 0.01$ to <0.001), lower than in the KDB cohort between 6 months and 1 year ($p = 0.026$ to <0.001), and lower than in the T-hook cohort at 1 month ($p = 0.012$) and from 6 to 12 months ($p < 0.001$). The survival probability of achieving ≤15 mmHg and ≤18 mmHg in the S-lot cohort was significantly better than in others by $p < 0.001$ and 0.005, respectively. At 3 months, the T-hook cohort showed significantly lower IOP than the TMH cohort ($p = 0.029$), and at 1 week, IOP was marginally lower than in the KDB ($p = 0.063$) and TMH ($p = 0.052$) cohorts, based on Dunnett's test. However, no significant differences in postoperative IOP were observed among the three sectorial canal-opening surgery (COS) groups beyond 6 months. Conclusions: Among the four MIGS cohorts, S-lot provided the most substantial mid-term postoperative IOP reduction. The T-hook cohort showed marginally superior IOP reduction at 1 week compared to the KDB and TMH groups.

Others

8. **Daiki Sakai, Masashi Fujihara, Satoshi Yokota, Makoto Nakamura, Yasuo Kurimoto(2022)**

   One-year outcomes and predictable factors for microhook ab interno trabeculotomy

   International Journal of Ophthalmology, Vol. 15, No. 4, Apr.18, 2022

9. **Masaki Tanito, Ichiya Sano, Yoshifumi Ikeda and Etsuko Fujihara(2017)**

   Short-term results of microhook ab interno trabeculotomy, a novel minimally invasiveglaucoma surgery in Japanese eyes:initial case series

   Acta Ophthalmologica. 2017: 95: e354–e360

10. **Satoru Kanda,Takashi Fujishiro2, Takashi Omoto, Ryosuke Fujino, Takahiro Arai,Yohei Nomoto & Makoto Aihara(2021)**

    Comparison of effectiveness and complications in trabeculotomy with phacoemulsification between ab externo and ab interno using a spatula-shaped microhook

    Nature Portfolio Scientific Reports 11, Article number: 17259 (2021)

11. **Masaki Tanito, Aika Tsutsui, Kaoru Manabe, Mihoko Mochiji(2022)**

    Comparison of outflow facility before and after the microhook interno trabeculotomy

    Eye (2022) 36:760–765 licensed to The Royal College of Ophthalmologist

12. **Noriyuki Sotani, Sentaro Kusuhara, Wataru Matsumiya, Mina Okuda, Sotaro Mori, Rei Sotani, Kyung Woo Kim, Ryuto Nishisho and Makoto Nakamura(2022)**

    Outcomes of Microhook ab Interno Trabeculotomy in Consecutive 36 Eyes with Uveitic Glaucoma

    Journal of Clinical Medicine,2022,11,3768

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