

## Abstract 9

### NON-PERFORATING INTRASCLERAL STABBING FOR SUTURELESS 23G SCLEROTOMY CLOSURE

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#### Introduction:

The introduction of transconjunctival sutureless vitrectomy (TSV) has marked an important step forward for vitreoretinal surgery. The main idea of TSV is to utilize self-sealing microincisional sclerotomies that prevent leakage and help maintain a healthy environment in the postoperative period. In this respect, sutureless sclerotomy closure offers the advantage of faster wound healing and reduced conjunctival scarring and postoperative inflammation. Therefore, complications such as leakage, hypotonia, choroidal detachment, choroidal hemorrhage and endophthalmitis caused by a sutureless wound may overshadow the success of this widely accepted approach. Currently, the need for suturing leaking sclerotomies have not been eliminated completely. There are different reports regarding the suturing rate of at least 1 sclerotomy in 23 gauge (G) TSV (0-38.5%), with hypotonia rates varying between 2.8% to 11.3%. Closure with sutures or alternative methods is entirely dependent on experience and individual preference. Herewith, the promising advantages of sutureless closure are turning surgeons away from 23G TSV, and smaller TSV approaches are gaining popularity. However, the stiffness and efficiency of the instruments, which are lost as 23G is avoided, remains another issue worth discussing. Herein we describe a novel technique to facilitate 23G sclerotomy closure in TSV surgery and discuss its efficacy in achieving wound closure.

#### Materials and methods:

This is a retrospective and cross-sectional study covering the clinical experience of consecutive patients who underwent 23G TSV using a standard 3 port 23G PPV (DORC, Zuidland, The Netherlands). Sclerotomies were created in superonasal (SN), superotemporal (ST) and inferotemporal (IT) quadrants using the DORC 23G one-step vitrectomy system. Chandelier fibers and trocars were removed at the end of vitrectomy and leakage of sclerotomies were evaluated. Non-perforating intrascleral stabbing (NIS) was performed when a chandelier or sclerotomy wound failed to close despite 30 seconds of wound massage and/or pressure application with a metal scleral depressor. Technically, NIS procedure is performed with the use of a bent 20G or 23G microvitreoretinal (MVR) blade. Initially, the MVR blade is inserted transconjunctivally into the sclera from the ergonomically convenient proximal or distal side, approximately 2 mm from the leaking sclerotomy. The blade is then advanced intrascleral so that it creates a non-perforating intrascleral incision that traverses the sclera in half-thickness. Care should be taken that the intrascleral pathway passes under the outer ostium of the sclerotomy, is slightly larger than the sclerotomy wound, and overlaps at an angle with the previously created sclerotomy incision. As the MVR blade passes below the leaking sclerotomy, the intrascleral stabbing is advanced approximately 2 mm further, eventually creating an intrascleral incision of about 4 mm in length. MVR blade is then withdrawn. Before removing the MVR blade, the external wound of the sclerotomy is gently massaged with a scleral depressor while holding the MVR blade within the scleral pathway. The fluid trapped within the sclerotomy incision is wiped out with this maneuver. In most cases, closure may not be achieved with a single NIS attempt. Repeating the process, especially from different angles, may facilitate success. In this study patients between the age of 16-85 years who underwent NIS for at least one sclerotomy

were included to the study group. Inclusion criteria required at least 1 month of follow-up after TSV surgery and NIS procedure. Patients with apparently thin sclera and diagnosis of connective tissue diseases such as Marfan syndrome were excluded. Individuals who underwent combined phacoemulsification and TSV were not removed from the study. Cases with all types of endotamponade were included to this study. Silicone oil did not constitute a contraindication for inclusion. Repeated TSV procedures such as silicone oil extraction and revision PPV of the same patient who underwent NIS procedure before were recorded as separate new cases and further investigated. Preoperative characteristics such as age, gender, laterality of the eye, lens condition, diagnosis, history and number of previous PPV surgeries were examined for each study group participant. Intraoperative data including surgical procedure, duration of vitrectomy (short:<1 hour, long:> 1 hour), rate of sclerotomy and chandelier closure with NIS procedure and suture requirement despite NIS technique were noted.

## **Results:**

Medical records of 668 consecutive patients who underwent 23G TSV in 2 referral centers between January 2019 and February 2022 were reviewed for this study. Among these, 230 cases who underwent NIS for at least one sclerotomy were included to the study group. Study group consisted of 230 eyes of 180 patients (137 male, 93 female) with a mean age of 56.5 + 16 (range: 16-85) years. Mean follow-up was 6.3+4.7 months (range: 1-24 months). A total of 1951 sclerotomies were performed in all 668 cases reviewed, and 650 sclerotomies of 230 cases met the inclusion criteria of the study group. Cases requiring NIS procedure to close at least 1 sclerotomy accounted for 33.3% of the total. In this study, the overall success of NIS technique was found to be 91.0%; of the 650 leaking sclerotomies 592 could be closed with this technique while 9.1% (n=58) required sutures to close ( $p<0.001$ ). Besides 23G sclerotomies, 84 cases of the study underwent NIS procedure for leaking 27G chandeliers. Eighty-three of these chandeliers could be closed with NIS technique (98.8%) ( $p<0.001$ ). Considering all sclerotomies of the study group, an average of 1.28+0.52 attempts was required to close the sclerotomies successfully with the NIS procedure. The closure rates obtained with the NIS procedure were statistically significant in all 3 sclerotomy locations ( $p<0.001$ ) and there was no statistically significant difference between the success rates ( $p=0.104$ ). Closure rates with NIS technique increased significantly in all sclerotomy sites in cases with no history of TSV. Statistically, there was no significant correlation between endotamponade type and the success of the NIS procedure. The most frequent complication of the NIS technique was subconjunctival hemorrhage. Mean preoperative IOP was measured as 14.1+4.9 mmHg in this study. ). Both hypotonia (<6 mmHg) and choroidal detachment occurred in one eye of a case (0.04%) which resolved within the first 2 weeks of the TSV without any surgical intervention.

## **Conclusions:**

The results of this study support that interventions beyond wound massage are required for sutureless closure of 23G sclerotomies in a particular group of patients. Our results show that 91.0% of leaking 23G sclerotomies can be closed with the above described NIS procedure with more than 1 attempt of NIS (mean: 1.28+0.52 attempts). This technique has helped close 98.8% of leaking 27G chandelier wounds. Theoretically changing the sclerotomy architecture may contribute to optimizing sutureless sclerotomy closure. Our NIS procedure is also related to the sclerotomy architecture and is comparable with the previously published techniques. Briefly, this study describes a new technique for optimizing sutureless sclerotomy closure in TSV. Our results show that it significantly reduces the need to suture 23G sclerotomy wounds and is effective in closing 27G chandelier wounds. It offers the ease of application with a regular MVR blade and helps to eliminate the need to suture sclerotomies or re-perforate the sclera to achieve sclerotomy closure even when silicone oil is used. However we have

to acknowledge that this technique can not eliminate the need to suture sclerotomies in all cases and the learning curve may take some time. The preliminary results of this study show that NIS procedure appears to be a practical, reproducible, cost-effective and uncomplicated approach.

**Sources:**

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- 2- Fujii GY, De Juan E Jr, Humayun MS et al. Initial experience using the transconjunctival sutureless vitrectomy system for vitreoretinal surgery. *Ophthalmology*. 2002;109:1814-20.