Two Ports via Ciliary Sulcus Vitrectomy with Modified Yamane Technique for Dislocated IOL

Luca Ventre, Paolo Caselgrandi*, Guglielmo Parisi, Paola Marolo, Michele Reibaldi

Department of Surgical Sciences, Eye Clinic Section, University of Turin, Turin, Italy

*Corresponding author: Paolo Caselgrandi, Department of Surgical Sciences, Eye Clinic Section, University of Turin, Via Cherasco 23, Turin 10126, Italy.

Citation: Ventre L, Caselgrandi P, Parisi G, Marolo P, Reibaldi M (2021) Two Ports via Ciliary Sulcus Vitrectomy with Modified Yamane Technique for Dislocated IOL. J Surg 6: 1434 DOI: 10.29011/2575-9760.001434

Received Date: 21 September, 2021; Accepted Date: 12 October, 2021; Published Date: 15 October, 2021

Abstract

Purpose: To propose a new surgical technique that involves the realization of a via ciliary sulcus vitrectomy and the implantation of a sutureless scleral fixation IOL through only two sclerotomies with 27-gauge trocar. The aim is to develop a less invasive technique, reducing the number of surgical wounds compared to the commonly used techniques.

Methods: Two 27-gauge trocars are inserted at 3 and 9 o’clock, both 2 mm from the corneal limbus. The dislocated lens or IOL is removed and an anterior and, if necessary, posterior vitrectomy is performed through the same two trocars. Finally, a three-piece IOL is inserted and a scleral fixation without suture is performed according to the modified Yamane technique, making two flanges at the ends of the IOL haptics.

Results: The reduction of the number of surgical wounds allows for a lower risk of postoperative hypotony, a lower incidence of intra and post-operative complications and less patient discomfort in the postoperative period.

Conclusions: The technique we present for the implantation of a scleral fixation IOL without suture has the advantage of reducing the number of sclerotomies required, with a view to a less invasive surgery, and allowing both an anterior and posterior vitrectomy.

Keywords: Dislocation; Flanged haptics; Minimally invasive technique; Sutureless intrascleral intraocular lens fixation, Vitrectomy, Yamane technique

Introduction

In recent years several sutureless scleral fixation Intraocular Lens (IOL) implantation techniques with a three-piece IOL have been described for the treatment of aphakic patients or with lens or IOL dislocation who lack adequate capsular support. Insufficient capsular support is often secondary to trauma, previous complicated cataract surgery, pseudoexfoliation syndrome or Marfan syndrome [1,2]. The technique described by Yamane et al. [3] has become very popular, in which two 30-gauge thin-wall needles are used to engage and externalize the haptics of a 3-piece IOL, to minimize the size of the sclerotomies and therefore the risk of postoperative hypotony than previously used sutureless scleral fixation techniques. In a subsequent work, Yamane et al. [4] describes a new variant of the technique that involves the enlargement of the ends of the haptics induced by cautery, to form flanges that increase the stability of the IOL decreasing the risk of dislocation. Multiple variations of the Yamane technique have been described, including some that use 27-gauge trocars instead of 30-gauge thin-wall needles to create scleral tunnels from which to externalize the haptics, suggesting greater versatility and handling in carrying out the procedure [5-13]. In this article we propose a new technique that involves the realization of a via ciliary sulcus vitrectomy and the implantation of a scleral fixation IOL without suture with a modified Yamane technique through only two sclerotomies with 27-gauge trocars. The aim is to develop a less invasive technique, reducing the number of surgical wounds compared to the commonly used techniques in which three sclerotomies are performed for vitrectomy and two others to extract the IOL haptics.
Surgical Technique

Two 27-gauge valved trocars are inserted at 3 and 9 o’clock, both 2 mm from the corneal limbus. The two trocars are inserted at 3 and 9 o’clock because these are the positions that most facilitate the execution of the vitrectomy. Furthermore, the eyes of patients who need to undergo this technique are affected by subluxation or dislocation of the lens/IOL, often related to Pseudoexfoliation Syndrome (PEX), trauma or other pathologies with the risk of developing ocular hypertony. Therefore in these patients it is useful to spare the conjunctiva and the sclera in the upper sectors for possible future glaucoma surgery.

Extrusion of Dislocated Lens/IOL and Vitrectomy

The Surgical Technique Differs Depending on the Situation that Arises:

Subluxated Cataract: In the case of subluxated cataracts, the corneal incision is performed at 12 o’clock by a 2.2 mm blade. A dispersive viscoelastic is introduced into the anterior chamber. A service corneal incision is made with a 15-degree blade, located at 90° clockwise from the main corneal incision. A continuous capsulorhexis is performed using a dedicated forceps. At this point, if necessary, four iris hooks can be placed at 1.30, 4.30, 7.30, 10.30 o’clock to support the anterior capsule. Finally, we proceed with the phacoemulsification of the cataract and the removal of the capsular sac.

Dislocated IOL in Vitreous Chamber: In the case of a dislocated IOL in the vitreous chamber, an anterior vitrectomy is first performed through the two trocars located at 3 and 9 o’clock, where the vitrectome and the infusion cannula are inserted, using the light emitted by the microscope. Subsequently, a service corneal incision is made with a 15-degree blade, located at 6 o’clock, in which the infusion cannula is inserted during the execution of the posterior vitrectomy, introducing the light source and the vitrectome into the two trocars at 3 and 9 o’clock. With a 27-gauge vitreous forceps the IOL is retrieved and brought to the anterior chamber. Once the IOL is placed on the iris, a corneal incision is made at 12 o’clock using a 2.2 mm blade. In the case of a folding IOL, the cut is widened to 3 mm and the IOL is extracted with forceps after folding it by introducing a spatula into the corneal incision at 6 o’clock (Figure 1). In the case of rigid IOL, the cut is widened to 5.5 mm and the IOL is extracted with forceps without being bent.

Figure 1: Extraction of the subluxated IOL without cutting it. The IOL is bent with the use of forceps and a spatula (A), it is extracted through the main corneal incision (B).
the haptic through cauterization. The flanges of the haptics are then pushed back and covered with the conjunctiva. The main corneal incision is sutured with 10/0 Nylon while hydration is performed to the service corneal incision.

**Figure 2:** Injection of the IOL into the anterior chamber. The leading haptic is grasped with a 27-gauge vitreous forceps inserted into the trocar.

**Figure 3:** Haptic externalization. We proceed first with the extraction of the trocar and then with the extraction of the 27-gauge vitreous forceps with the consequent externalization of the haptic.

**Figure 4:** Fixation of the trailing haptic. The trailing haptic is brought into the vitreous chamber with forceps where it is grasped with a 27-gauge vitreous forceps inserted in the second trocar.

**Discussion**

IOL scleral fixation technique by forming flanges on the ends of the haptics proposed by Yamane et al. [4] has become very popular and several variations have started to spread. In particular, the stabilization of the IOL haptics using 27-gauge trocars, instead of the 30-gauge thin-wall needles as described by the original Yamane technique, is more manageable especially for surgeons who already have experience of vitreous-retinal surgery, as Walsh et al. describes in his work [5]. The author indicates that the use of trocars allows several advantages including an easier externalization of the haptics, both because it is no longer necessary to insert their ends into narrow needles and because it is possible to externalize one haptic at a time without having to do it for all and two simultaneously. However, the need for these patients without capsular support to undergo a vitrectomy means that the affected eyes must undergo at least five sclerotomies, counting the three standard accesses for vitrectomy and the two others for fixation of the haptics. The technique we present in this work has the advantage of reducing the number of sclerotomies required, performing a less invasive surgery. By reducing the number of surgical wounds, a lower risk of postoperative hypotony, a lower
incidence of intra and postoperative complications and less patient discomfort in the postoperative period is expected.

Ishikawa et al. proposed in his work [8] a modified Yamane technique that reduces the number of sclerotomies to only three accesses necessary to perform a vitrectomy. Instead of making two new accesses to insert the two 27-gauge needles to fix and stabilize the IOL haptics, the needles are inserted into two of the three trocars used to perform the vitrectomy, thus avoiding two surgical wounds compared to the original Yamane technique. In his study Ishikawa compared the two techniques, highlighting that there are no differences in terms of postoperative visual acuity between one technique and the other. In this context, the technique that we present aims to further reduce the number of sclerotomies necessary, making only two accesses, one at 3 and one at 9 o’clock, both at 2 mm from the corneal limbus. The same two accesses can also be used for an anterior and posterior vitrectomy. In this way an IOL scleral fixation technique is standardized and can be adaptable to any eventuality: vitrectomized eyes, non-vitrectomized eyes in which only anterior vitrectomy is required, non-vitrectomized eyes in which a complete vitrectomy is required.

This technique also involves performing an anterior vitrectomy via ciliary sulcus and this aspect allows to reduce the ensuing vitreous tractions compared to an anterior vitrectomy via a limbal access.

References

1. Wagoner MD, Cox TA, Ariyasu RG (2003) Intraocular lens implantation in the absence of capsular support: A report by the American Academy of Ophthalmology. Ophthalmology 110: 840-859.
2. Shen JF, Deng S, Hammersmith KM (2020) Intraocular Lens Implantation in the Absence of Zonular Support: An Outcomes and Safety Update: A Report by the American Academy of Ophthalmology. Ophthalmology 127: 1234-1258.
3. Yamane S, Inoue M, Arakawa A, Kadonosono K (2014) Sutureless 27-gauge needle-guided intrascleral intraocular lens implantation with lamellar scleral dissection. In: Ophthalmology 121: 61-66.
4. Yamane S, Sato S, Maruyama-Inoue M, Kadonosono K (2017) Flanged Intracocular Lens Fixation with Double-Needle Technique. In: Ophthalmology 124: 1136-1142.
5. Walsh MK (2017) Sutureless Trocar-Cannula-Based Transconjunctival Flanged Intracocular Lens Fixation. Retina 37: 2191-2194.
6. Todoric B, Stem MS, Koocagayala K (2018) STRUCTURAL ANALYSIS AND COMPREHENSIVE SURGICAL OUTCOMES OF THE SUTURELESS INTRASCLERAL FIXATION OF SECONDARY INTRAOCULAR LENSES IN HUMAN EYES. Retina (Philadelphia, Pa) 38: S31-S40.
7. Ishikawa H, Fukuyama H, Komuku Y (2020) Flanged intraocular lens fixation via 27-gauge trocars using a double-needle technique decreases surgical wounds without losing its therapeutic effect. Acta Ophthalmologica 98: e499-e503.
8. Abbey AM, Hussain RM, Shah AR (2014) Sutureless scleral fixation of intraocular lenses: Outcomes of two approaches. The 2014 yasuo tano memorial lecture. Graefe’s Archive for Clinical and Experimental Ophthalmology 253: 1-5.
9. Todoric B, Thanos A, Woodward MA, Wolfe JD (2016) Sutureless intrascleral fixation of secondary intraocular lens using 27-gauge vitrectomy system. Ophthalmic Surgery Lasers and Imaging Retina 47: 376-379.
10. Totan Y, Karadag R (2012) Trocar-assisted sutureless intrascleral posterior chamber foldable intraocular lens fixation. Eye (Basingstoke) 26: 788-791.
11. Hu ZX, Lin HS, Ye L (2018) Sutureless Intraclearal Haptic-Hook Lens Implantation Using 25-Gauge Trocars. Journal of Ophthalmology 2018.
12. Thanos A, Lau-Sickon LK, Wolfe JD, Hassan TS (2019) Three Port Sutureless Posterior Chamber Intraclearal Lens Intraclearal Fixation: A Novel Approach. Retina 39: S16-S20.