

Cauterization technique for suture erosion in transscleral fixation of intraocular lenses

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Abstract

• **Transscleral suturing is a commonly applied technique to fix intraocular implants in the sulcus. A major problem after transscleral implantation is suture erosion that normally happens in the late post-surgery period and may result in an increased incidence of endophthalmitis. Here we describe an original cauterization method by using a glass rod to melt the exposed suture end without damaging the suture knot in the sclera to avoid suture exposure in sclera-fixed IOL implantation. This is a simple, quick and effective technique that can be performed without conjunctiva incisions and will help to reduce suture erosion related complications.**

• **KEYWORDS:** suture erosion; cauterization technique; intraocular lenses

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INTRODUCTION

Transscleral suturing is frequently used in posterior chamber intraocular lens (IOL) implantation in the absence of an intact posterior capsule. Steady traction on the transscleral sutures secure IOL insertion into the ciliary sulcus. To avoid direct suture knot exposure, scleral flaps^[1], autologous cornea^[2], or fascia lata^[3] have been used to cover the knot and other methods such as rotation of the knot^[4], Z-suture technique and fibrin glue-assisted sutureless technique have also been described^[5,6]. In China the most widely used method is scleral flapping. Due to the atrophy of

sclera flaps over time, the suture end will be exposed causing granuloma formation and increased risk of infection. Surgical management for an exposed suture knot associated with scleral fixation includes cauterizing the suture, cutting loose ends off the suture, burying the exposed suture beneath conjunctiva and tenon's capsule, covering the knot with a half thickness corneal or scleral autograft^[2,7]. However, all these above mentioned surgical methods have limitations. Here we present a simple and easy method by applying a heated glass rod to melt the exposed suture end, which is simple and suitable to perform in clinic.

SURGICAL TECHNIQUE

The procedure can be performed under topical anesthesia with 0.5% proparacaine hydrochloride ophthalmic solution. After patient was properly positioned and seated under the slit-lamp, a lid speculum was placed in the eye to hold the lids open. Patient's head must be secured by an assistant or a tight strap to assure always being pressed forward and his eyes need to turn to a certain direction to ensure exposing suture forward. The high power objective (16×) should be used to provide a detailed view of the suture end through the conjunctiva. The tip of a glass rod was heated over a spirit lamp. The hot tip was immediately applied to touch and cauterize the area of the suture end until the suture knot melted down flat. Try carefully and gently cauterizing the knot, and make sure the 10-0 polypropylene suture end retracted beneath conjunctiva without breaking the knot. Postoperatively, tobramycin and dexamethasone eye drop was administered 4 times a day and then tapered for the next 1 week until the conjunctiva healed.

Representative Cases

Case 1 A 48-year-old man presented for suture erosion after transscleral fixation of posterior chamber IOL in his right eye. Five months previously, he was treated with pars plana lensectomy combined vitrectomy with transscleral IOL fixation in another hospital. The sutures were buried beneath the scleral flap at that time. Two weeks before the visit to our hospital, the patient had suture knot erosion manifested by significant red eye and foreign body sensation.

Hyperemia of conjunctiva and suture erosion was observed in the right eye and no discharge was noted (Figure 1A). The

cornea, anterior chamber, pupil, and IOL were normal, and no retinal detachment was observed. We applied the cauterizing technique for the patient under topical anesthesia at a slit-lamp (Figure 1B). The operation time was less than 1min. At the 1 week follow-up visit, the knot retracted sufficiently and was covered by conjunctiva. Three months later, the exposed suture knot was fully covered by conjunctival epithelium, and the IOL was stably and centrally positioned without any tilt. No complications were found at the 18-month follow-up visit, and the knot remained buried.

Case 2 A 9-year-old boy presented for foreign body sensation due to transscleral fixation of posterior chamber IOL in the right eye. One year earlier, he had a blunt ocular trauma and lost his lens in the right eye. Primary closure of scleral wound was performed on the day of the trauma in our hospital. Vitrectomy and transscleral fixation of IOL were performed with a double-armed 10-0 polypropylene suture 1 month later due to vitreous hemorrhage. The clinical follow-up was performed and suture knot erosion was observed on the nasal aspect of the right eye (Figure 1C). No discharge was noted and the anterior and posterior ocular segments were quiescent without signs of inflammation. The cauterization treatment was completed under topical anesthesia at a slit-lamp (Figure 1D) in a minute with the boy's head fixed with his father's help. At the 3ds' follow-up visit, the knot retracted sufficiently and the exposed area got covered by conjunctiva. The suture knot was barely visible under quiescent conjunctiva and no complications were found at the 2 years' follow-up visit.

DISCUSSION

Scleral fixation of a posterior chamber IOL can be used in the surgical management of aphakia in an eye lacking capsule support. There are a few complications with this surgical management including endophthalmitis [8,9], suture erosion through the sclera, cystoid macular edema, choroidal hemorrhage, retinal detachment, and glaucoma [10-13]. Suture erosion is the most common complication of transscleral fixed posterior chamber IOL [14]. The irritation resulting from the loosened suture after suture erosion might result in eye rubbing due to foreign body sensation and increased potential risk of endophthalmitis[9].

Therefore, it is well-advised to prevent suture erosion with different surgical methods during operation. Four-point fixation technique was described which allowed stable four-point fixation and the suture knot to be buried in the eye without the use of scleral flaps [15]. Hoffman advocated two scleral fixation techniques without conjunctival dissection and using suture retrieval through a scleral tunnel [16-17].

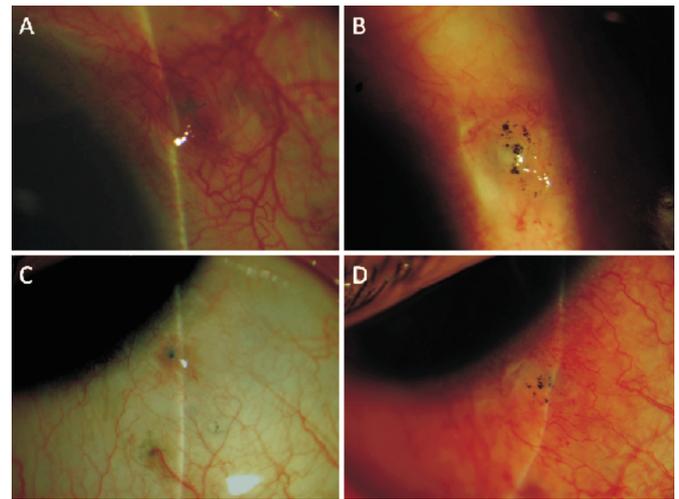


Figure 1 Representative slit lamp photography of suture erosion after transscleral suture fixation of posterior chamber IOL and postoperative photography of cauterizing technique with a glass rod A: Hyperemia of conjunctiva and suture erosion of Case 1; B: The exposed suture was melted flat and retracted beneath conjunctiva 3d after cauterization of Case 1; C: Although a scleral flap was prepared to prevent suture erosion, the knot eroded through the atrophic scleral flap five months later of Case 2; D: One week after cauterization, the suture was fully covered by conjunctival epithelium of Case 2.

Agarwal *et al*^[6] reported a new fibrin glue-assisted sutureless surgical technique providing good flap closure and IOL centration and stability without suture-related complications. Szurman *et al* [5] in 2010 presented a novel knotless technique for transscleral suture fixation of intraocular implants. Another technique described by Koytak *et al*^[18] allows burial of the knot and the free suture ends within the sclera, without using a scleral flap or pocket or even a conjunctival opening.

However, scleral flaps are more frequently used to cover a transscleral knot by Chinese ophthalmologists. So far, late atrophy of the sclera flap followed by suture erosion is often observed in postoperative follow-up visit. Bucci *et al*^[2] suggested covering an exposed knot associated with scleral fixation with a half thickness corneal or scleral autograft. Other surgical management for an exposed suture knot includes trimming loose ends of the suture, burying the exposed suture beneath conjunctiva and Tenon's capsule. Some cauterizing equipments have been mentioned, such as a disposable cautery, a thermal cautery, a hand cautery (Optemp, Alcon) and an argon laser [7]. Up to now the application of a glass rod as cauterizing tool has not been reported in the literature to the best of our knowledge.

The cauterizing technique with a glass rod for suture knot erosion is a simple, easy and applicable procedure for outpatient treatment which could be performed in doctor's

office. Besides it is minimally invasive, maintaining suture knot and complete conjunctiva. The procedure can be performed under topical anesthesia, thus it reduced risks of retrobulbar anesthesia and general anesthesia. And this technique does not need any difficult surgical skills or advanced instruments; hence it is applicable in the clinical settings and can be easily mastered. The patient does not need to be hospitalized, that would remarkably reduce medical expenses.

The two patients mentioned above were followed up in our out-patient clinic for 1 year, and the results of the procedure were satisfactory. There is a potential risk of suture knot break that should be informed well to the patient, however, it is rare to meet a patient with suture erosion through conjunctiva in early postoperative follow-up. Late postoperatively, it is more likely that the haptics of transscleral fixed posterior chamber IOL are well positioned and fibrotically attached to the ciliary sulcus, and the suture is no longer required [7]. Even if the suture knot becomes loose by cauterizing, the residual end of enlarged suture knot can still be firmly fixed within the sclera. Therefore, the cauterizing technique is safe for late suture erosion even if the suture knot is damaged.

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