



Sub-Conjunctival Silicone Oil after 23G Suture-less Vitrectomy in Out-Patient Setting

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Abstract

Aim: To introduce the symptoms, risk factors of sub-conjunctival Silicone Oil (SO) and evaluate a new technique to remove sub-conjunctival SO in an out-patient setting.

Methods: Retrospective study: Patients demonstrated sub-conjunctival SO nodules after 23-gauge trans-conjunctival suture-less Pars Plana Vitrectomy (PPV) with SO tamponade were treated by 26-gauge syringe needle in an outpatient setting. Data such as signs, symptoms, and risk factors for SO leaking, slit lamp examination were collected.

Results: 32 patients (32 eyes) were observed in the study. Slit lamp exam found obvious sub-conjunctival SO blebs near previous SO injection sites in all subjects. Anterior segment OCT revealed the buildup of SO nodules due to poor scleral wound healing. The risk factors for SO leaking and found that the duration of the operation, multi-operation, history of pathological myopia, diabetes and high IOP post-operation are major risk factors. All sub-conjunctival SO blebs were removed by 26-gauge syringe needle clearly. The discomfort of surgical eyes significantly reduced after removal of sub-conjunctival SO.

Conclusion: Our method of removing sub-conjunctival SO blebs using 26-gauge syringe needles was found to be safe and effective in an outpatient setting.

Keywords: Sub-conjunctival silicone oil; 23G Suture-less vitrectomy; Removal; Out-patient setting

Introduction

Suture-less vitrectomy technique using a small-diameter needle has been found to have a shorter operating time, improving patient comfort and faster visual recovery compared to a 20-gauge vitreoretinal surgery [1-4]. However, a number of associated problems, such as dislocation of the cannulas intraoperatively, early postoperative hypotony, choroidal detachment, and possibly an increased risk of infectious endophthalmitis have been reported in recent years [2]. The 23-gauge trans-conjunctival suture-less vitrectomy in the surgical management of vitreoretinal diseases is associated with a lower rate of complications specific to the procedure [5-7].

Silicone Oil (SO) implantation with 23-gauge vitrectomy complications are seldomly described. Previous case reports have mostly concentrated on complications involving oil bubbles of various sizes found in the corneal endothelium, trabecular meshwork, the anterior and posterior surface of the lens capsule, sub-retina, and even the optic nerve [6,8]. These complications were thought to occur from the oil droplets escaping through the vitreum.

In our study, we reported patients with sub-conjunctival SO leakage near the SO injection site after 23-gauge trans-conjunctival suture-less Pars Plana Vitrectomy (PPV) with intravitreal SO tamponade. And we removed the sub-conjunctival SO blebs in outpatient facilities with a novel approach.

Materials and Methods

Retrospective study

The data of patients with sub-conjunctival SO leakage near the SO injection site whose sub-conjunctival SO blebs were removed by novel approach at the Eye Hospital of Wenzhou Medical University were collected. Sub-conjunctival SO nodules were evaluated both by slit lamp and anterior segment OCT. The signs and symptoms, as well as risk factors for SO leaking of each patient were recorded. The informed consent was obtained from all participants before treatment.

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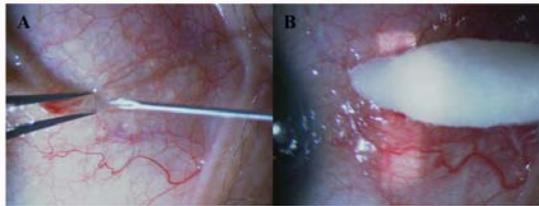


Figure 1: Removal of sub-conjunctival silicone oil. (A) Puncture the side of bleb and ophthalmologic forceps to gently coax the SO towards the opening; (B) The bleb must be completely flattened using cotton swab moistened with saline solution in order to ensure that the residual SO has been removed.

Ethical approval

All study procedures adhered to the tenets of the Declaration of Helsinki.

Surgical procedure

The treatment was performed under topically anesthesia in outpatient facilities and a speculum was used to prevent blinking. The conjunctiva was then disinfected with iodine. The practitioner then localized and focused on the SO bleb using a diffuse beam behind the slit lamp. A 26-gauge 1 ml syringe needle is held parallel to the conjunctiva with the aperture facing away from the sclera and the needle pointed horizontally towards the bleb (Figure 1A). The needle was then used to puncture the side of bleb and ophthalmologic forceps to gently coax the SO towards the opening. The bleb must be completely flattened in order to ensure that the residual SO has been removed. The opening is then compressed with a cotton swab moistened with saline solution to help close the puncture and minimize blood loss (Figure 1B). The performing doctor then carefully examines the lesion to ensure that there was no sclera perforation. Then, the eye is treated with antibiotic eye drops and ointment before the speculum is removed.

Results

32 patients (32 eyes) who underwent 23-gauge trans-conjunctival suture-less PPV with SO tamponade (5,000. cSt) demonstrated sub-conjunctival SO leakage near the SO injection site. 46.8% (15/32 eyes) were treated for Rhegmatogenous Retinal Detachment (RRD), 31.3% (10/32 eyes) for Proliferative Diabetic Retinopathy (PDR) and 21.9% (7/32 eyes) for giant retina tear. They were referred for further treatment for complaining of foreign body sensation in their post-surgical eyes during 1 week to 2 weeks follow-up.

The SO nodules could be classified by morphology under slit lamp: single versus multi-nodular (Figure 2A, 2B). And 68.7% (22/32 eyes) were of the latter form. Slit lamp exam found obvious sub-conjunctival SO blebs near previous SO injection sites in all subjects. The distributions of SO were 12 eyes in nasal quadrant, 9 eyes in temporal, 3 eyes in superior, 8 eyes in inferior. Anterior segment spectral OCT (RTvue OCT, Optovue, Inc. German) reported low refractive signal in blebs area indicating the buildup of the SO.

Before removal of sub-conjunctival SO, 93.8% patient presented with conjunctival injection, 100% with foreign body sensation, 81.3% with dry eye, and 18.8% with conjunctival hemorrhage. And 15.6% patient presented with conjunctival injection, 9.37% with foreign body sensation, 81.3% with dry eye, and 0% with conjunctival hemorrhage three months after treatment (Table 1).

We also categorized the risk factors for SO leaking and found

Table 1: Symptom & chief complain pre- and post-operation.

Symptom & chief complain	pre-operation	post-operation		
		1 week	1 month	3 months
conjunctival injection	30/32	28/32	28/32	05/32
foreign body sensation	32/32	05/32	03/32	03/32
dry eye	26/32	20/32	11/32	08/32
pain	14/32	08/32	0/32	0/32
conjunctival hemorrhage	06/32	03/32	0/32	0/32

Table 2: Risk factors for SO leakage.

Symptom & chief complain	pre-operation	post-operation		
		1 week	1 month	3 months
conjunctival injection	30/32	28/32	28/32	05/32
foreign body sensation	32/32	05/32	03/32	03/32
dry eye	26/32	20/32	11/32	08/32
pain	14/32	08/32	0/32	0/32
conjunctival hemorrhage	06/32	03/32	0/32	0/32



Figure 2: The SO nodules morphology. (A) Mild conjunctival injection surrounding a SO nodule with conjunctival vessels both crossing over and running through the nodule. This patient complained of foreign body sensation at the 1 week follow up; (B) Multi-SO nodules found in the sub-conjunctival space.

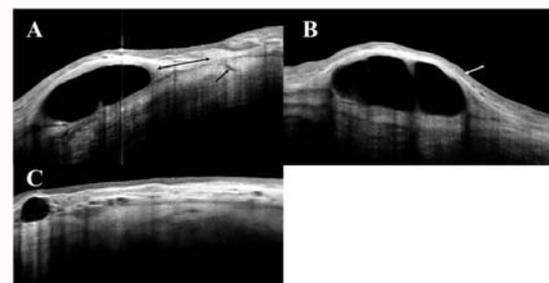


Figure 3: Anterior segment OCT photos on healing process. (A) The surgical incision remains unhealed and open at the 3 months follow-up s/p vitrectomy. The dark line connecting the nodule and the incision represents the path of the escaping SO and is surrounded by the irregular sclera scarring; (B) The SO nodule nested in Tenon's capsule (white arrow); (C) OCT photography performed at the one-week follow-up s/p bleb draining showing a significantly smaller collection of SO.

that the duration of the operation, multi-operation, and history of pathological myopia, diabetes and high IOP post-operation are major risk factors (Table 2).

As part of the pre- and post-operation care, anterior segment photos showed that there was a delay in the healing of the SO injection site which allowed the SO to leak out through the surgical opening and build up under Tenon's Capsule in patients with this complication. In addition, anterior segment OCT indicated that the healing process found in these patients was abnormal with irregular scarring (Figure 3A-3C).

Discussion

As a postoperative complication of 23-gauge trans-conjunctival suture-less pars plana vitrectomy, sub-conjunctival SO leakage has not been officially defined as well as no established treatment guideline for SO removal. In our study, the sub-conjunctival SO leakage mostly happened in 1 week to 2 weeks after SO injection.

Teixeira A et al. [9] evaluated twelve consecutive eyes underwent 23-gauge trans-conjunctival vitrectomy suture-less self-sealing sclerotomy by Ultrasound Biomicroscopy (UBM). They found only in the single-step incision SO was observed in the wound. Erakgun T [10] analyzed 40 eyes of 40 patients with Diabetic Tractional Retinal Detachment (DTRD) and Proliferative Vitreoretinopathy (PVR) in the study. Three patients had a small sub-conjunctival SO bubble and one eye required suture placement at the end of surgery due to SO leakage postoperatively. The necessity of suture the wound even though no leakage after remove the Traca intra-operatively with SO tamponade was still in debate. The leakage of the scleral wound will induce post-operation complications, such as ocular hypotony, retinal detachment especially in inferior quadrant, even sub-choroidal expulsive hemorrhage [11]. Our study suggested that it is better to suture the wound especially for weak or malfunction sclera conditions.

In this study, we applied anterior segment OCT clearly revealed the buildup of SO. The SO leakage could be induced by any 3-port scleral wound leakage. Multi-operation, long operation duration, high myopia, diabetes seems like to affect the sclera wound recovery and irregular scarring, which may result in the SO injection site remaining open after surgery. Multi-operation and long operation duration also could cause the wound edge not aligned due to multiple access the wound. High myopia patients with relative thinner sclera and choroid may affect sclera healing retard. The consideration of these risk factors could help us reduce and avoid this complication [12].

In our study, the SO nodule was safely and effectively removed in all patients by our approach in outpatient setting. Patients do not need to be hospitalized and feel more comfortable. Meanwhile, avoid larger conjunctival incision and no further wound suture was needed.

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