

Passive Silicone Oil Removal with 23-Gauge Transconjunctival System

23 Gauge Transkonjonktival Sistem ile Pasif Silikon Alınması

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ABSTRACT

Purpose: To introduce the results of passive removal of 1000 centistokes (cs) silicone oil with 23 gauge transconjunctival system.

Materials and Methods: Ninety-one eyes of 91 patients were studied retrospectively. 23-gauge trocar cannulas were entered from the pars plana in two steps and waited for removal of silicone oil from the trocar cannulas passively. The reason for the primary surgery, preoperative and postoperative visual acuities and intraocular pressures, duration of silicone oil removal, need for peroperative suture, additional surgical procedures, complications and postoperative follow-up time were recorded.

Results: Mean follow-up time was 15.9±6.1 months. 37 eyes (40.6%) were underwent additional operations as phacoemulsification, epiretinal membrane peeling and/or endolaser during surgery. Mean duration of silicone oil removal was 7.1±0.5 minutes. Mean intraocular pressure decreased significantly at all visits postoperatively; and it was measured as 10.9±2.2 mmHg at the first day, 15.9±5.4 mmHg at the first month and 14.9±2.2 mmHg at the 6th month. 26 eyes (28.5%) peroperatively needed at least one suture. Postoperatively, visual acuity increased in 35 eyes (38.4%). Only in one eye postoperative serious hypotonia (intraocular pressure<5 mmHg) was recorded. 6 eyes (6.6%) were reoperated due to the redetachment of the retina after silicone oil removal.

Conclusion: Removal of 1000 cs silicone oil with 23 gauge transconjunctival system is effective, fast, safe and comfortable. Postoperative complications are rare.

Key Words: 23 gauge, transconjunctival, passive silicone oil removal.

ÖZ

Amaç: 23 gauge (g) transkonjonktival sistem ile pasif olarak 1000 sentistokes (cs) silikon yağı geri alınmasının sonuçlarını sunmak.

Gereç ve Yöntem: 91 hastanın 91 gözü geriye dönük olarak incelendi. 23 g trokar kanülleri pars planadan yerleştirilerek, silikon yağının trokar kanüllerden pasif olarak geri alınması beklendi. Primer cerrahinin sebebi, ameliyat öncesi ve ameliyat sonrası görme keskinlikleri ve göz içi basınçları (GİB), silikon yağının geri alınma süresi, peroperatif sütür ihtiyacı, uygulanan ek cerrahi girişimler, komplikasyonlar ve ameliyat sonrası izlem süresi kaydedildi.

Bulgular: Ortalama takip süresi 15.9±6.1 aydı. 37 göze (%40.6) ek cerrahi girişim olarak, fakoemülsifikasyon, epiretinal membran soyulması ve/veya endolazer uygulandı. Ortalama silikon geri alınma süresi 7.1±0.5 dk idi. Ortalama GİB, ameliyat sonrası tüm vizitlerde ameliyat öncesi değere göre anlamlı olarak düşük izlendi; GİB, ameliyat sonrası 1. günde 10.9±2.2 mmHg, 1. ayda 15.9±5.4 mmHg ve 6. ayda 14.9±2.2 mmHg idi. 26 gözde (%28.5) peroperatif en az bir sütür ihtiyacı oldu. 35 gözde (38.4) ameliyat sonrası görme artışı izlendi. Sadece bir gözde ameliyat sonrası ciddi hipotoni (GİB<5 mmHg) izlenirken, 6 göze (%6.6) silikon alınması sonrası nüks retina dekolmanı nedeniyle cerrahi uygulandı.

Sonuç: 23 gauge transkonjonktival sistem ile 1000cs silikon yağı geri alınması, etkili, hızlı, güvenli ve komforlu bir yöntemdir. Ameliyat sonrası komplikasyonlar nadirdir.

Anahtar Kelimeler: 23 gauge, transkonjonktival, pasif silikon yağı geri alınması.

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INTRODUCTION

Silicone oil tamponade was firstly used in 1962 for vitreoretinal surgery, and since then, it has been commonly used especially for complex retinal detachment and proliferative vitreoretinopathy surgeries.¹ Although the stable physical and chemical properties make the silicone oil a long term tamponade, it has a few complications such as cataract formation, keratopathy and secondary glaucoma.^{2,3} It is well known that the incidence and severity of these complications increase with the duration of intraocular silicone oil tamponade. So, the general principle is, silicone oil must be removed without delay once retina is attached and stable at follow-up.

Several techniques that include anterior and/or posterior segment approach have been described for silicone oil removal.^{4,6} Conventionally, phakic and most pseudophakic patients have undergone 20 Gauge (G) pars plana active or passive silicone oil removal surgery. However 20 G surgery requires conjunctival dissection and scleral port suturing which were difficult and time consuming procedures for reoperated eyes. Additionally, these procedures may reduce patient comfort by increasing postoperative inflammation.

The 23 G transconjunctival vitrectomy was first developed by Eckhart in 2003 and currently being used with increasing frequency.⁷ Transconjunctival passive silicone oil removal was first described by Kapran et al. with 25 G system.⁸ Our study aims to introduce the results of the passive removal of 1000 centistokes (cs) silicone oil with 23 G transconjunctival system, and to evaluate its efficacy, reliability and potential complications.

MATERIALS AND METHODS

The records of the patients who had undergone passive 23 G silicone oil removal in our retina clinic between January 2008 and April 2012 were reviewed retrospectively. The study received approval from Gazi University Medical School Ethics Committee.

Demographic features of the patients, reason for the primary surgery, duration of silicone oil tamponade, preoperative and postoperative visual acuity (VA), intraocular pressure (IOP), anterior and posterior segment findings, duration of silicone oil removal, need for peroperative suture, additional surgical procedures, complications, and postoperative follow-up time were obtained from patient files and surgery videos.

Passive removal of silicone oil with the 23 G technique was performed by using a 23 G Transconjunctival Vitrectomy System (DORC). Three sclerotomy openings were made with a 23 G two step trocar cannula system (DORC).

The infusion line was opened with the bottle at a height at 60 cm. The 1000 cs of silicone oil was started to drain from the eye through the two superior microcannulas passively by the effect of the infusion line. When fluid started flowing from one of the 23 G cannulae, it was closed with 23 G plug, and the eye was deviated so that the remaining oil would drain faster. After silicone oil removal was completed, the retinal status of each eye was examined with a 23 G light probe. Any additional procedures such as endolaser and/or epiretinal membran peeling were performed as required. In eyes with coexisting cataract, phacoemulsification and intraocular lens implantation was performed before the silicone oil removal. Air-fluid exchange was performed when needed.

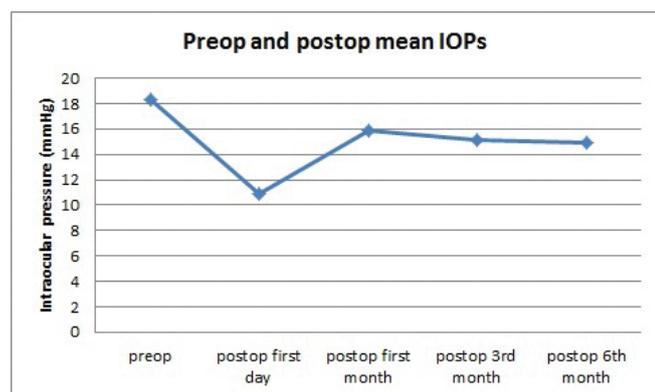
At the end of the operation, infusion line was temporarily occluded and the superior cannulas were removed by applying countertraction with a cotton swab stick. Cotton swab was applied over sclerotomy ports for approximately 20 seconds to prevent leakage. In case of leakage, the sclerotomy was sutured with 7-0 vicryl suture transconjunctivally. Paired t-test was used for statistical analysis and a p value less than 0.05 was considered statistically significant.

RESULTS

Ninety-one eyes of 91 patients were enrolled. Mean age was 49.0 ± 20.7 years (9-78 years). Mean postoperative follow-up time was 15.9 ± 6.1 months (2-27 months). The reason for the primary surgery was rhegmatogenous retinal detachment in 60 eyes, penetrating or blunt trauma in 13 eyes and tractional retinal detachment secondary to diabetic retinopathy in 18 eyes. At the time of silicone oil removal, 29 eyes were phakic, 51 were pseudophakic and 11 were aphakic. The patients were operated on under retrobulber (n=87) or general anesthesia (n=4).

Mean duration of silicone oil tamponade was 6.3 ± 7.6 months (3-48 months) 72.5% being less than 6 months. Mean surgical time for the passive drainage of silicone oil was 7.1 ± 0.5 minutes (5.1-8.5 minutes). 37 eyes (40.6%) had additional interventions such as phacoemulsification (n=23), membrane peeling (n=4) and endolaser (n=9) during the surgery. 26 eyes (28.5%) needed at least one suture because of the leakage from the sclerotomy sites. Mean preoperative IOP was 18.3 ± 6.6 mmHg (8-44 mmHg), which significantly decreased to 10.9 ± 2.2 mmHg (4-20 mmHg) at the first postoperative day ($p < 0.05$).

The mean IOP was 15.9 ± 5.4 (8-38 mmHg) at the first postoperative month, 15.1 ± 2.3 (8-32 mmHg) at the third postoperative month and 14.9 ± 2.2 (8-29 mmHg) at the sixth postoperative month ($p < 0.05$, at all visits), (Graphic).



Graphic: Preoperative and postoperative mean intraocular pressure in eyes that underwent passive silicone oil removal by a 23 G transconjunctival technique.

There was early postoperative serious hypotonia (IOP<5 mmHg) in one eye because of the leakage from the sclerotomy sites which needed to be sutured in the second postoperative day. Mean preoperative VA was 1.26 ± 0.4 logMAR which changed to 1.08 ± 0.46 logMAR postoperatively. There was an increase in VA in 35 eyes (38.4%) postoperatively.

Postoperative retinal redetachment was observed in 6 eyes (6.6%) and they underwent reoperation. There was mild postoperative vitreous hemorrhage in one eye which regressed spontaneously within 2 weeks.

DISCUSSION

There are several techniques which have been described for silicone oil removal in the literature.^{4,6} It is possible to remove silicone oil passively or by active aspiration. Depending on the lens status, anterior and/or posterior approaches have been used. In aphakic patients, silicone oil can be removed passively from corneal or limbal incision through the fluid flow from scleral infusion cannula or anterior chamber maintainer. However, it was shown that silicone oil removal through anterior approach was reported to decrease the corneal endothelial cellular density.⁵ Additionally, this technique does not allow the surgeon to perform additional interventions to the retina, such as membrane peeling or endolaser, following the silicone oil removal. In conventional techniques, silicone oil was removed through pars plana with 20G sclerotomies, where additional procedures can be done when needed. However, these techniques have disadvantages such as difficult dissection of scarred conjunctiva and the need for suture resulting in significant postoperative inflammation and discomfort.

The 23 G silicone oil removal technique used in this study has some advantages over the techniques described above. Because of being transconjunctival, this technique does not need conjunctival dissection.

Conjunctiva sparing surgery provides convenience for glaucoma surgery that may be needed in the future. Also because of tunneled two step sclerotomies, most 23 G surgeries end without any suture.

Transconjunctival surgery leads to less postoperative inflammation and discomfort. In the present study 26 of 91 eyes (28.5%) needed at least one suture to the sclerotomies. This ratio is high when compared to the other 23 G surgeries in the literature. Parolini et al., reported this ratio as 3.9% in a 23 G vitrectomy series of 943 eyes.⁹

In our study, the patients with penetrating or blunt trauma and the patients under the age of 30 needed at least one suture to the sclerotomies. So, it may be thought that primary indication and age of the patient may affect scleral structure and leakage ratio. Supporting this idea, Parolini et al.,⁹ reported the suture ratio as 30% under age of 30. Additionally, all of the eyes in our study underwent a total vitrectomy including vitreous base in their primary surgery, which meant that almost no vitreous was left to help occlusion of the sclerotomies.

Yıldırım et al.,⁴ reported the mean 1300 cs silicone oil removal time as 9 minutes passively from corneal incision in aphakic eyes. Kapran et al.,⁸ determined the 1000 cs silicone oil removal time as 7.3 minutes with 25 G transconjunctival sutureless system. In our study, the mean 1000 cs silicone oil removal time was evaluated as 7.1 minutes which is compatible with previously published papers on this subject.¹⁰

Retinal redetachment, hypotony and expulsive haemorrhage are the reported major complications of silicone oil removal.⁶ An important factor in the development of retinal redetachment is the continuous traction exerted by epiretinal membranes present in proliferative vitreoretinopathy.

In our study, 6.6% of the eyes had retinal redetachment during approximately 16 month follow-up time. With 23 G silicone oil removal technique, additional posterior segment manipulations such as epiretinal membrane peeling and endolaser were provided at the same surgery with silicone oil removal. So, this procedure may help prevent recurrent retinal detachment following silicon oil removal.

There was a statistically significant difference between preoperative and postoperative IOPs in our study. However only in one patient (1.1%) postoperative serious hypotonia (IOP<5 mmHg) was recorded. Fine et al. reported this ratio as 2.8% at their 23 G vitrectomy series.¹¹ Parolini et al. determined this ratio as 3.3% by defining severe hypotony as IOP<7 mmHg.⁹ Higher ratio of sclerotomy suturing for preventing leakage may be the explanation for the occurrence of less hypotony in our study.

In conclusion, passive removal of 1000 cs silicone oil with 23 G transconjunctival system seems to be effective, fast and safe. Patient rehabilitation is faster and more comfortable than 20 G surgery. It also allows surgeon to perform additional posterior segment manipulations decreasing the postoperative potential complications. However, large, controlled and prospective studies with longer follow-up period are needed to be conclusive.

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