Original Article

Frequency of Complications of Silicone Oil in the Surgical Treatment of Rhegmatogenous Retinal Detachment

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Purpose: To determine the frequency of complications of silicone oil used for internal tamponade in the treatment of rhegmatogenous retinal detachment (RRD).

Study Design: Prospective case series.

Place and Duration of Study: Department of Ophthalmology Lady Reading Hospital Peshawar from January 2013 to May 2014.

Material and Methods: All those patients who were admitted with RRD with proliferative vitreoretinopathy (PVR) grade C due to myopia, pseudophakia and trauma in which silicone oil 1000 centistoke was used for internal tamponade were included in the study. Patients with fresh RD, age less than 16 years and more than 70 years and repeat surgery were excluded from the study. After taking approval from ethical research committee, data collection process was started and documentation was done according to the designed proforma including age, gender, etiology and complications. Data was analyzed by SPSS version 16 and represented in the form of charts and graphs.

Results: 300 eyes of 300 patients were included in this study in which 190 (63.33%) were males and 110 (36.67 %) were females having age range from 16 to 70 years and mean age was 40 ±5 SD. The most common cause of retinal detachment was trauma having 170 (56.66%) while the least common was aphakia having 40 (13.33%) cases. The most frequent complication was cataract formation noted in all phakic patients followed by increased intra ocular pressure

present in 210 (70%) cases. Prolapse of uveal tissue through pars plana sclerotomy site was seen in 1 (0.33%) patient.

Conclusion: Silicone oil used for internal tamponade leads to cataract formation in almost all cases followed by secondary glaucoma.

Key words: Silicone oil. Retinal detachment. Trauma. Cataract. Intraocular pressure.

Retinal detachment is a condition in which the sensory retina is separated from the retinal pigment epithelium (RPE).[1] There are mainly three types of retinal detachments in which the most common is rhegmatogenous retinal detachment. Out of all these three, rhegmatogenous retinal detachment[2] is the most common and the common risk factors for rhegmatogenous retinal detachment are axial myopia, aphakia/pseudophakia, Nd Yag laser capsulotomy, lattice degeneration of retina and trauma.[3]

Typically these patients present with symptoms such as flashes of light, floaters, peripheral visual field loss, and blurred vision.[4] The main principle of retinal detachment is to close all retinal breaks and approximate sensory retina with RPE. It is treated surgically by two approaches, the external or standard approach which is done by scleral buckling by using solid silicone material or sponges and is indicated for uncomplicated retinal detachment.[5] The second approach is called internal approach by doing vitrectomy and using silicone oil or long-acting gases. It is indicated for complicated cases such as those with PVR grade C, giant retinal tears, coloboma of choroid, and penetrating ocular trauma.[6,7]

Silicone oil injection mainly serves two functions. The first is the displacement of the retina toward the eye wall by its surface tension effect and volume displacement, and the second is to a lesser degree the tamponade of the superior retina by its buoyancy force.[8]

It is transparent, lighter than water (specific gravity of 0.97) and has a refractive index of 1.404. The silicone oil has a surface tension with water of 40 mN/m, which is less than that of a gas bubble.[9]

Although silicone oil has many advantages but it is not free of complications like cataracts, band keratopathy, recurrent inferior retinal detachment, pupillary block glaucoma, closure of the inferior iridectomy, fibrous epiretinal and sub retinal proliferations, pain, subconjunctival migration of oil, increased intraocular pressure(40.57%) and changes in refractive status of the eye.[9,10]

Rationale of the current study is to know about the frequency of complications which occur due to silicone oil in internal approach for retinal detachment in this area. This study is important for creating local statistics of the complications due to silicone oil. Furthermore it will open a gateway for future researchers on this topic and help in the patient's best evidence based care.

MATERIAL AND METHODS

This prospective study was conducted in the department of ophthalmology Lady Reading Hospital Peshawar from Jan 2013 to May 2014 with total duration of 17 months. After taking approval from ethical research committee data collection process was started in all those patients who were admitted in the mentioned duration with retinal detachment due to myopia, pseudophakia and trauma for whom silicone oil was used for internal approach and documentation was done according to the preformed proforma including age, gender, etiology and complications while excluding the patients younger than 16 years, greater than 70 years and fresh cases of retinal detachment. Data was analyzed by SPSS version 16 software and represented in the form of charts and graphs.

All the patients underwent thorough history, detailed clinical evaluation like visual acuity, pupillary reflex for presence or absence of relative afferent papillary defect (RAPD), measurement of intra ocular pressure(IOP) and fundus examination to locate the breaks and viability of the retina. B scan ultrasound was performed when there was poor fundus view. Before surgical intervention patients underwent pre-operative blood tests including random blood glucose

level, viral serology (HbsAg and Anti-HCV Ab). An informed consent was taken from each patient explaining the prognosis and inclusion in the study. All the patients were followed for 6 months post operatively for complications of silicone oil by repeated follow ups at regular intervals and by measuring IOP, visual acuity and fundoscopy at each visit. Approval was taken from the hospital ethical committee, "Postgraduate Medical Institute, Institutional Research and Ethics board". Frequency of complications due to silicone oil used for internal tamponade in the treatment of retinal detachment was noted.

RESULTS

A total of 300 eyes of 300 patients were included in this study. Males were 190 (63.33%) while 110 (36.67 %) were females (Table 1). The age range was 16-70 years with mean age 40 ± 5 SD. Trauma was the leading cause of RRD present in 170 (56.67%) followed by myopia in 90 (30 %) and pseudophakia in 40 (13.33%) (Table 2).

Table 1: Gender distribution of patients (n = 300).

Etiology of Retinal Detachment	No of Patients	Percentage
Male	190	63.33
Female	110	36.67
Total	300	100

After 6 months follow-up of using silicone oil for retinal detachment, cataract formation was the most common complication present in all 100% cases, followed by rise in intra ocular pressure in the same eye in 210 (70%). Recurrence of retinal detachment was present in 78 (26%), emulsified oil in 10 (3.33%), while band keratopathy, blocked Ando's iridectomy and phthisical eye each in 5 (1.66%).

Table 2: Causes of retinal detachment: (n = 300).

Etiology of Retinal Detachment	No of Patients	Percentage
Pseudophakic	40	13.33 %
Myopia	90	30 %
Trauma	170	56.66%

Table 3: Complications of silicone oil (n = 300).

Complication	No of Patients	Percentage
Cataract	300	100
Increased IOP	210	70
Recurrent RD	78	26
Oil emulsification	10	3.33
Band keratopathy	5	1.66
Blocked Ando's iridectomy	5	1.66
Phthisical eye	5	1.66
Sub conjunctival silicone oil	2	0.66
Uveal prolapse	1	0.33

Silicone oil under the conjunctiva and prolapse of uveal tissue through pars plana was seen in 2 (0.66%) and 1 (.33%) respectively. (Table 3).

DISCUSSION

Since the introduction of silicone oil, there have been multiple controversies concerning its safety ideally for intraocular use. For these reasons, removal of silicone oil is ideally advocated as prolonged silicone oil tamponade has been demonstrated to induce multiple anterior segment complications including cataract, glaucoma and keratopathy. [11,12,13,14,15,16] In our study 300 patients were recruited in 17 months with 190 males and 110 females (males; females 1.72: 1). Study conducted by Khoroshilova-Maslova et al also showed more males than females by using silicone oil in retinal detachment which is similar to our results.[11] Similarly in many other international studies males are more than the females using silicone oil.[12,13,14] In our study age range was 16-70 years with mean age 40 ± 5. Study conducted by Hassan MU et al has showed range as 45-83 years with mean age of 58.33 ± 7.12 SD years.[10]

The main reason of difference in younger patients in our study and other studies is that the most common cause of retinal detachment was trauma which is more common in young age. The other etiologies like myopia and other factors can cause RRD late. This is why the majority of patients were of younger age as compared to others. Among all 300 cases the most common cause was trauma having 170 (56.66%) followed by myopia with 90 (30%) cases and pseudophakia in 40 (13.33%) cases. Haimann and colleagues have documented the most common cause of retinal detachment as myopia having 40-50% followed by aphakia with 30-40% cases and 10-20% was due to the ocular trauma. [17] Similarly according to Rehman et al in his study conducted on 1159 patients with retinal detachments, the three most common causes were myopia , aphakia/pseudophakia and trauma reported as aphakia/pseudophakia having 795 (68.56%), 136 (11.7%) had myopia of variable degree and 74 (6.4%) had a history of blunt trauma.[18] Our region has suffered more from terrorism as compared to the other parts of the world therefore most of our patients were brought with blunt trauma to the different body organs including eye with bomb blasts injuries. The other difference of etiologies is that majority of the population in our region have low educational status as compared to Punjab and other parts of the country/world due to which peoples suffer more from accidents and social crimes. When we followed our patients for 6 months post operatively for the complications of silicone oil we found that the most common complication was cataract which occurred in all (100%) cases, followed by increase in intra ocular pressure which occurred in 210 (70%) and recurrence of retinal detachment having frequency of 78 (26%) of cases, emulsified oil in anterior chamber in 10 (3.33%), while band keratopathy, blocked Ando's iridectomy and phthisical eye each 5 (1.66%) cases and minimum number of cases had uveal prolapse.

Abbas et al has showed in their study that the most common complication of silicone oil is cataract formation which was observed in 46 (85.18%) out of 54 patients followed by the raised intra-ocular pressure (IOP >25 mm Hg) occurred in 28 (40.57%) which is similar to our study.[19] Hoerauf et al, Rizzo et al showed that most common complication was inflammation of the anterior chamber.[20,21] While other studies have documented emulsified oil in anterior chamber as the most common complication in the retinal detachment surgery by internal approach but in our study it was 10 (3.33%).[22,23] In all these studies the sample size of the patients was less and the period of follow up was less or slightly more than our study.

CONCLUSION

In our set up retinal detachment mostly occurs due to trauma in young to middle age males. When silicone oil is used for internal tamponade for retinal detachment then it provides good results in terms of reattachment but the visual outcome can be compromised due to multiple factors like cataract formation, increased intraocular pressure, recurrence of retinal detachment and band keratopathy.

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