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Early versus late silicone oil removal after pars plana vitrectomy for primary rhegmatogenous retinal detachment

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ORIGINAL ARTICLE

Early Versus Late Silicone Oil Removal After Pars Plana Vitrectomy for Primary Rhegmatogenous Retinal Detachment

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Abstract

Purpose: **To evaluate the outcomes of 2-month silicone oil removal after vitrectomy for primary hematogenous retinal detachment with a 6-month delay in silicone oil removal in terms of complications and recurrence rates of redetachment.**

Methods: **This is a prospective interventional study comprising 50 eyes suffering from recent hematogenous retinal detachment. Participants in this research were divided into two groups, A and B, with an equal sample number for each (25 eyes). Removal of silicone oil was done after 2 months and 6 months for both groups (A) and (B), respectively. Postoperative follow-up was done for both groups.**

Results: **Oil emulsification, anterior segment inflammation, and cataract intraocular pressure all showed statistically substantial variations between the research groups.**

Conclusion: **In our early and late removal series, the time of silicone oil tamponade did not have an important impact on reattachment rates. Early SOR at 2 months did have the same healing effect as planned removal at 6 months. Early planned removal in our rural communities resulted in better patient compliance. The longer delay before the removal of the oil has caused major complications in certain patients.**

Keywords: Pars plana vitrectomy, Rhegmatogenous retinal detachment, Silicone oil tamponade

1. Introduction

Rhegmatogenous retinal detachment (RRD) is blinding eye disease with occurrence that arrays from 6.3 to 17.9 per 100,000 people, considering the peak occurrence among patients in their 60 s.[1]

In the early 1900s, Gonin reported upon studying the process of the RRD that it was a very well-known reason for retinal detachment. Prior conditions that cause the progress of RRD include (1) liquefaction of the vitreous, (2) tractional pressures that shatter the retina, and (3) a retinal breakthrough that causes the fluid to seep into the subretinal space.[2]

The goal of retinal reattachment surgery is to reconnect the neurosensory retina to the retinal pigment epithelium by putting a scleral buckle (SB) from the outside or internally utilizing pneumoretinopexy, pars plana vitrectomy (PPV), and tamponade. Retinal fractures are sealed utilizing laser photocoagulation or cryotherapy.[3]

A 'plug or tent put snugly into a wound, orifice, etc. to stop bleeding' is referred to as a 'tamponade.' In the case of retinal detachment surgery, tamponades provide surface tension at the retinal breaks, preventing the flow of fluids into the subretinal space until a permanent seal is provided by the retinopexy (photocoagulation or cryopexy). The most used types of tamponades are gases and silicone oils.[4]

A silicone oil injection together with vitreoretinal surgery enhances the prognosis for complicated retinal detachment associated with proliferative

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vitreoretinopathy (PVR), huge retinal tears, proliferative diabetic retinopathy, and ocular trauma.[5]

Eyes with retinal detachment managed with silicone oil were highly probable to fruitfully reattach, attain improved vision, and have not as much of postoperative complications as eyes with retinal detachment treated with an intraocular tamponade agent of sulfur hexafluoride gas.[6]

Dissimilar to intraocular gas, silicone oil is a liquid polymer that will not be absorbed or expanded. It is nonmiscible with aquatic and PFC liquid and forms a highly observable meniscus during the intraoperative use. The viscosity of silicone oil is bigger than the viscosity of gas, but its buoyancy is less than the buoyancy of gas as well as its surface tension. Silicone oil uses less retinal tamponade than gas because its buoyancy and surface tension are lower. However, its viscosity is higher.[7]

Silicone oil offers an inner tamponade, steadying, and fixation of the retina after vitrectomy. Yet, prolonged exposure to silicone oil can lead to complications in the long term, especially cataract, glaucoma, and keratopathy. Therefore, once a stable retinal condition is achieved, removing the silicone oil (SOR) is the thing to do.[8]

Silicone oil should be kept in place until steady structural and functional conditions are reached, and the proliferative process presumably has ceased. This stable condition is rather difficult to evaluate and depends on the clinical presentation and the surgeon's expertise. The timing of SOR remains debatable. It is not easy to determine the correct time for removal as there are no specific strictures to direct when the diffusion progression ends.[9]

Silicone oils that are commonly used are of viscosities of 1000 and 5000 cSt (cSt). Silicone oils have a less specific gravity (0.97 g/mL) than the vitreous (1.005–1.08 g/mL), and therefore float in the vitreous cavity. Gases float, as well, in vitreous cavity owing to the little specific gravity (0.001 g/mL). Not to mention that they have bigger buoyancy (upward force) compared with silicone oils.

Although silicone oil is a finest vitreous alternative, it can also cause many complications when kept in place for prolonged periods. Increasing intraocular pressure (IOP) or secondary glaucoma, corneal decompensation, and progressive cataract development are often reported side effects.[6–9] It also causes a worsening in eyesight if it emulsifies with time. That being the case, silicone oil is habitually removed after a period of retinal stability. As it shifts a moveable detached retina, removal sometimes leads to redetachment.[10]

2. Methods

The study is a prospective interventional one conducted at the Department of Ophthalmology, Faculty of Medicine, Al-Azhar University for 6 months. The sample was composed of 50 eyes with recent rhegmatogenous retinal detachment collected through the systematic random sampling technique.

We divided patients into two groups: (A) 25 eyes and (B) 25 eyes. All patients had pars plana vitrectomy (PPV) and silicone oil 5000 injection as a tamponade. We instructed them to remove silicon oil after 2 months for group (A) and 6 months for group (B). Follow-up after vitrectomy operation by complete ocular examination including indirect ophthalmoscope was done 1 day, 1 week, and 1 and 2 months for group (A) while it will continue till 6 months for group (B).

2.1. Inclusion criteria

Age (20–70) years.
Recent primary rhegmatogenous retinal detachment.
Phakic eye or pseudophakic.

2.2. Exclusion criteria

Old retinal detachment.
Traction retinal detachment.
Aphakic retinal detachment.
Recurrent retinal detachment.
Diabetic retinopathy.
Glaucoma.
History of intraocular surgery.

For the pars plana vitrectomy, all patients underwent complete preoperative ocular examination, the same operative steps in addition to complete and similar postoperative treatment and positioning. Follow-up after vitrectomy operation was by complete ocular examination including indirect ophthalmoscopy 1 day, 1 week, and 1 and 2 months for group (A) while it will continue till 6 months for group (B).

For silicone oil removal, all patients underwent complete preoperative ocular examination in addition to B-scan to assess the condition of the retina and to exclude cases of retinal redetachment under silicone oil from our study. The surgical steps are similar in all patients and they all underwent the same postoperative treatment. Complete eye examinations, including indirect ophthalmoscopy, are to be performed 1 day, 1 week, 1 month, and 3 and 6

months after surgery. Thereafter, patients will be followed up for signs of repeated retinal detachment and further adverse effects associated with silicone oil, such as insistent elevated intraocular pressure, cataract development, and corneal decompensation.

2.3. Statistical analysis

Statistical Programs for Social Sciences Version 20 was employed to analyze the data.

Mean and standard deviation are used to define quantitative parameters. Numbers and proportions are considered to be qualitative parameters. The comparability of parametric quantitative variables of both groups was done by Student's t-test. When the frequency is less than 5, use the X^2 test or Fisher's exact test to compare qualitative parameters. The Pearson correlation coefficient was used to assess the association between two normally distributed parameters. P values < 0.05 were reviewed as significant if the variables were not normally distributed.

2.4. Statement on ethics approval and informed consent from participants

The investigators presented themselves to each participant in the study, explained the purpose of the study, and then asked for their participation. All selected participants were fully informed about the purpose and expected benefits of the research. All ethical considerations are taken into account throughout the work process. Permissions were obtained from all participants and the confidentiality of the information was ensured. In addition, the Institutional Review Board and the Faculty of Medicine's Ethics Committee both gave their approval, making it official.

3. Results

Data were statistically analyzed utilizing IBM SPSS software, version 20.0. IBM Corp., Armonk, New York Utilize proportions and figures to describe qualitative facts. The distribution's normality was examined using the Kolmogorov–Smirnov test. The range (min and max), mean, standard deviation, median, and interquartile range (IQR) are used to represent quantitative data. The acquired findings' significance was determined at the 5% level.

The utilized tests were the following.

3.1. Chi-square test

Comparing several groups for categorical data.

3.2. Fisher's exact

When more than 20% of the cells have an anticipated count lower than 5, Chi-square must be corrected.

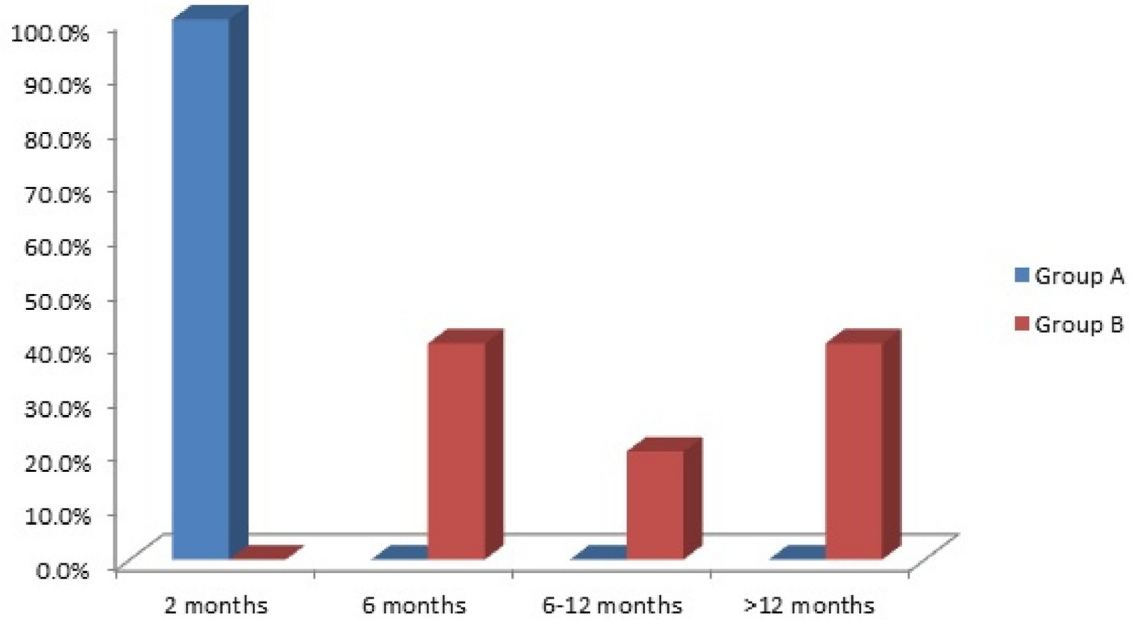

Fig. 1. Distribution of patients as regards time till SOR.

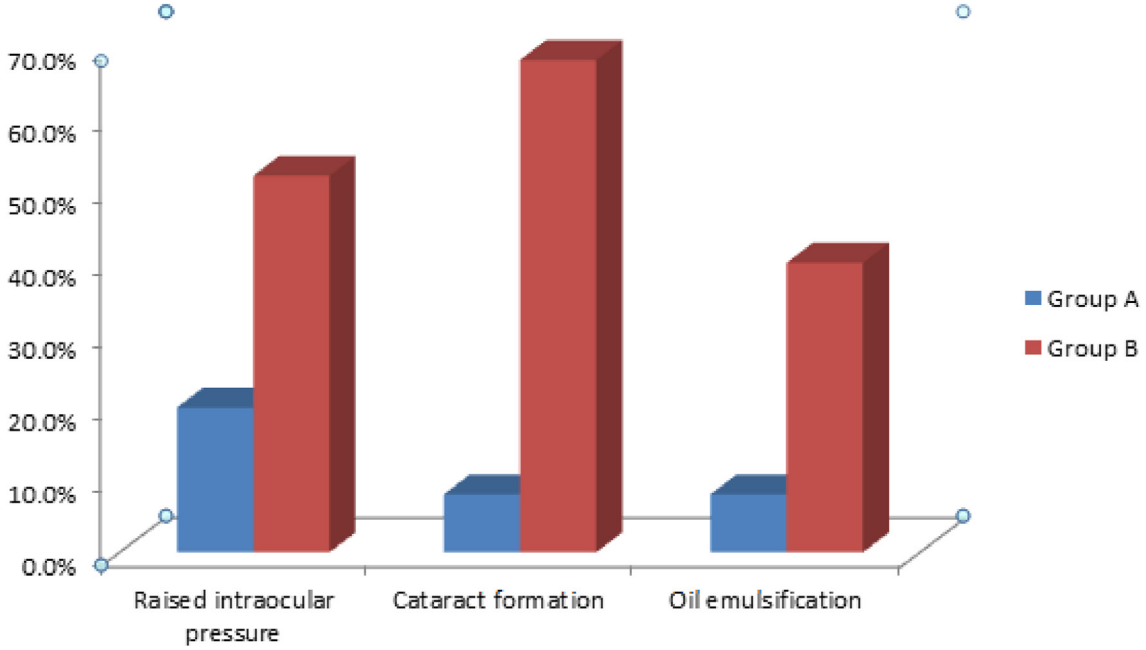

Fig. 2. Comparison between the study groups regarding complications before SOR.

3.3. Student's t-test

To evaluate two examined groups for quantitative parameters that are typically distributed.

3.4. Paired t-test

To compare two eras of properly dispersed quantitative variables.

3.5. Repeated measures ANOVA

To compare over more than two periods for quantitative variables that are regularly dispersed.

3.6. Mann–whitney test

To compare two investigated groups using nonparametric variables.

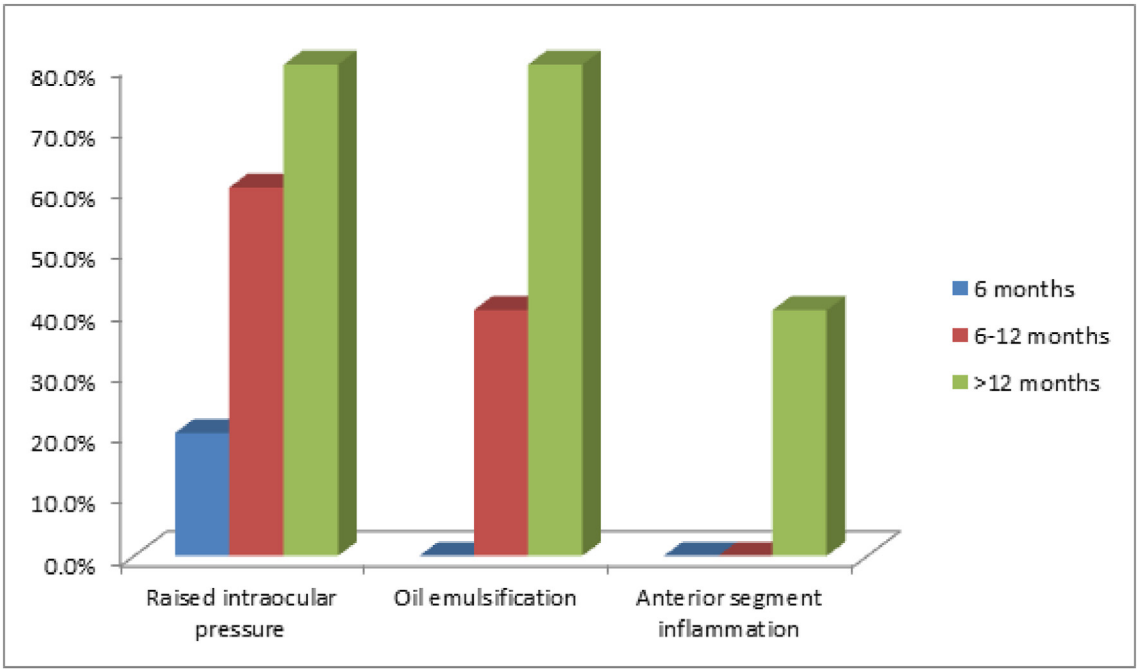

Fig. 3. Relation between Complications before SOR and time till SOR in group B.

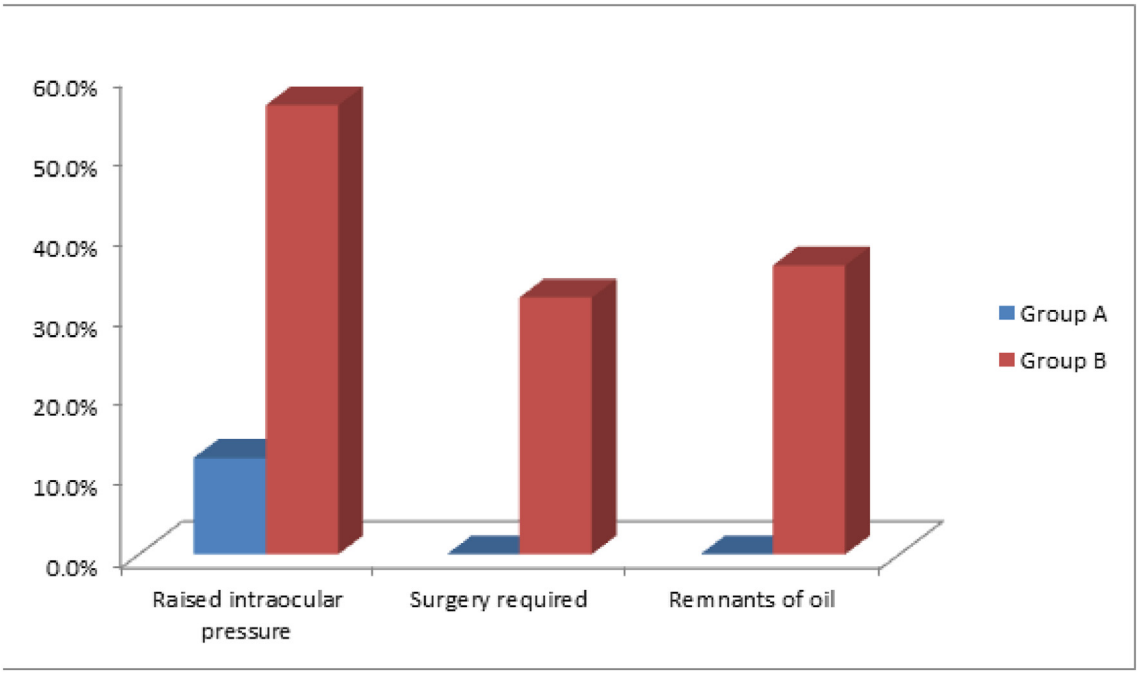

Fig. 4. Comparison between the study groups regarding complications after SOR.

Table 1. Comparison between the study groups regarding demographic data.

	Group A ($n = 25$)	Group B ($n = 25$)	Test	*P*
Age (years)				
Range	34–64	34–66	$t = 0.937$	0.353
Mean ± SD	50.84 ± 9.07	48.28 ± 10.22		
Sex	Number (%)	Number (%)		
Males	19 (76.0)	18 (72.0)		
Females	6 (24.0)	7 (28.0)	$\chi^2 = 0.104$	0.747
Residence				
Urban	3 (12.0)	5 (20.0)		
Rural	22 (88.0)	20 (80.0)	$\chi^2 = 0.595$	0.702

t, Student's t-test; χ^2, Chi-square test.
P: *P*-value used for comparing two groups.
*: Statistically substantial at $P \leq 0.05$.

Table 2. Comparison between the study groups as grading of proliferative vitreoretinopathy.

	Group A ($n = 25$)	Group B ($n = 25$)	Test	*P*
	Number (%)	Number (%)		
Grade 0	10 (40.0)	8 (32.0)		
Grade A	10 (40.0)	9 (36.0)	$\chi^2 = 3.084$	0.379
Grade B	1 (4.0)	5 (20.0)		
Grade C	4 (16.0)	3 (12.0)		

χ^2: Chi-square test.
P: *P*-value used for comparing two groups.
*: Statistically substantial at $P \leq 0.05$.

Table 3. Descriptive table showing time till SOR.

	Group A ($n = 25$)	Group B ($n = 25$)
	Number (%)	Number (%)
2 mo	25 (100.0)	0 (0.0)
6 mo	0 (0.0)	10 (40.0)
6–12 mo	0 (0.0)	5 (20.0)
>12 mo	0 (0.0)	10 (40.0)

Table 4. Comparison between the study groups regarding complications before SOR.

	Group A ($n = 25$)	Group B ($n = 25$)	Test	*P*
Intraocular pressure	Number (%)	Number (%)		
Normal	20 (80.0)	12 (48.0)	$\chi^2 = 5.556$	0.038*
Raised	5 (20.0)	13 (52.0)		
Cataract formation				
No	23 (92.0)	8 (32.0)	$\chi^2 = 19.100$	<0.001*
Yes	2 (8.0)	17 (68.0)		
Oil emulsification				
No	23 (92.0)	15 (60.0)	$\chi^2 = 7.018$	0.018*
Yes	2 (8.0)	10 (40.0)		
Keratopathy				
No	25 (100.0)	22 (88.0)	$\chi^2 = 3.191$	0.235
Yes	0 (0.0)	3 (12.0)		
Anterior segment inflammation				
No	25 (100.0)	21 (84.0)	$\chi^2 = 4.348$	0.110
Yes	0 (0.0)	4 (16.0)		

t: Student's t-test χ^2: Chi-square test.

Table 5. Relation between Complications before SOR and time till SOR in group B.

	6 months ($n = 10$)	6–12 months ($n = 5$)	>12 months ($n = 10$)	Test	*P*
Intraocular pressure	Number (%)	Number (%)	Number (%)		
Normal	8 (80.0)	2 (40.0)	2 (20.0)	$\chi^2 = 7.372$	0.025*
Raised	2 (20.0)	3 (60.0)	8 (80.0)		
Cataract formation					
No	5 (50.0)	1 (20.0)	2 (20.0)	$\chi^2 = 2.482$	0.289
Yes	5 (50.0)	4 (80.0)	8 (80.0)		
Oil emulsification					
No	10 (100.0)	3 (60.0)	2 (20.0)	$\chi^2 = 13.333$	0.001*
Yes	0 (0.0)	2 (40.0)	8 (80.0)		
Keratopathy					
No	10 (100.0)	5 (100.0)	7 (70.0)	$\chi^2 = 5.114$	0.078
Yes	0 (0.0)	0 (0.0)	3 (30.0)		
Anterior segment inflammation					
No	10 (100.0)	5 (100.0)	6 (60.0)	$\chi^2 = 4.348$	0.028*
Yes	0 (0.0)	0 (0.0)	4 (40.0)		

t: Student's t-test χ^2: Chi-square test.

Table 6. Comparison between the study groups regarding complications after SOR.

	Group A ($n = 25$)	Group B ($n = 25$)	Test	*P*
Intraocular pressure	Number (%)	Number (%)		
Normal	22 (88.0)	11 (44.0)	$\chi^2 = 10.784$	0.002*
Raised	3 (12.0)	14 (56.0)		
Cataract formation				
No	25 (100.0)	22 (88.0)	$\chi^2 = 3.191$	0.235
Yes	0 (0.0)	3 (12.0)		
Retinal redetachment				
No	23 (92.0)	22 (88.0)	$\chi^2 = 0.222$	1.0
Yes	2 (8.0)	3 (12.0)		
Keratopathy				
No	25 (100.0)	22 (88.0)	$\chi^2 = 3.191$	0.235
Yes	0 (0.0)	3 (12.0)		
Visual outcome				
No damage	25 (100.0)	22 (88.0)	$\chi^2 = 3.191$	0.235
Irreversible damage	0 (0.0)	3 (12.0)		
IOP control				
Only medications	25 (100.0)	17 (68.0)	$\chi^2 = 9.524$	0.004*
Surgery required	0 (0.0)	8 (32.0)		
Remnants of oil				
No	25 (100.0)	16 (64.0)	$\chi^2 = 10.976$	0.002*
Yes	0 (0.0)	9 (36.0)		

t: Student's t-test χ2: Chi-square test.

This table demonstrates that there was no statistically substantial variation in demographic information across the examined groups.

This table demonstrates that there was no statistically substantial variation between the study groups regarding grading of proliferative vitreoretinopathy.

This table shows that all of group A came back after 2 months to have oil removed, while among patients in group B there were 10 (40%) presented at 6 months, 5 (20%) presented between 6 and 12 months, and the rest presented after a year.

This table demonstrates that there was great statistically substantial variation between the studied groups as regards cataract formation and statistically substantial variation as regards intraocular pressure and oil emulsification.

This table demonstrates that there were statistically substantial variations in cataract intraocular pressure, oil emulsification, and anterior segment inflammation between the examined groups.

This table demonstrates that there were statistically substantial variations between the studied groups as regards intraocular pressure, IOP control, and remnants of oil.

4. Discussion

Vitreoretinal surgery is one of the newest and most modern surgical treatments for many eye diseases, which of late are thought of as irredeemable and ended in blindness in utmost cases.[11]

Silicone oil has proven to be an excellent vitreous body substitute. It should be clean, free of gases, heavy metals, and ions, and have a viscosity of 5000 cs and refractory index. However, many surgeons mention its negativities on optical tissues, especially the lens, cornea, and on intraocular pressure. Therefore, the goal of the research is to illustrate the residence time of silicone oil in the eye that disturbs the surrounding tissues. Silicone oil is an active instrument for repositioning of the mobile retina, and it makes an inner tamponade, steadying and fixation of the retina after vitrectomy. Because of possible complications, as described in the literature, the silicone oil should be eliminated from the operated eye with a precondition that the retina is stable and well fixed—most frequently—within 3 months from the date it was instilled.[12]

The part of silicone oil as a tamponade in complex RRD is undeniable. In these complex cases, the risk of reisolation is in height. Redetachment could

happen when silicone oil tamponade is used, yet regularly after silicone oil removal.[13]

Cibis et al. were the first to report the use of silicone oil to treat otherwise inoperable retinal detachments. In 1962, Scott and Zivojnovic modified the method, and many other surgeons reported encouraging results. Shared with vitreoretinal surgery, silicone oil injection turned out to be a typical method to recover outcomes in complex retinal detachments with PVR, giant retinal tears, proliferative diabetic retinopathy, or ocular trauma. Eyes that are treated with silicone oil will probably successfully reattach, achieve better vision, and have fewer postoperative complications than sulfur hexafluoride (SF6) gas as an intraocular tamponade for retinal detachment.[14]

However, silicone oils can lead to some complications in the long term, especially cataracts, glaucoma, and corneal lesions. That is why several authors recommend removing silicone oil when the retinal condition has stabilized. Removal of silicone oil is a risky procedure due to the repopulation of the epiretinal membrane and increased traction on the retina.[15]

Improvements in vitreoretinal microsurgery techniques over the past 20 years have significantly improved the number of efficacious treatments of PVR. The most commonly followed techniques are pars plana vitrectomy with or without scleral buckling, membrane peeling, relaxation retinotomy, internal laser coagulation, and temporary inner tamponade with intraocular gas or silicone oil. When there is a retinal tear during operation, as long as the tear seals and the vitreoretinal traction is completely relieved, a brief intraocular gas tamponade might be useful in ensuring retinal reattachment.[16]

Nonetheless, silicone oil tamponade for a long time may sometimes be preferred when the surgeons suspect that gas tamponade will not result in permanent reattachment of the retina. For example, in eyes with chronic retinal detachment or excessive edema, effective intra-laser photocoagulation of breaks or ischemic retinas may be difficult to achieve. In such patients, a silicone oil tamponade limits postoperative bleeding and allows for immediate postoperative photocoagulation.[17]

This study aims at comparing the consequences of silicone oil removal 2 months after vitrectomy for primary rhegmatogenous retinal detachment with tardy removal for 6 months with regard to complications and recurrence rate of redetachment.

In this study, there is no statistically substantial variation between the study groups as regards demographic data.

Fathala et al. concluded that the early resection group was a prospective group in 2015, including 32 patients (32 eyes) constituting 23 males and 9 females. The patient's average age was 43 years (range, 35–66 y), and the late resection group was a retrospective group of 19 patients (22 eyes), 13 male patients and 6 females. The patients average age was 34 years (range 13–55 y). In terms of demographics, there were insignificant differences between the two groups. In this thesis, we illustrate that there was no statistically substantial variation between the studied groups as regards the grading of PVR.[18]

Tavares et al., 2015 showed that 3.8% (2/53) of the patients had grade A PVR, 5.6% (3/53) had grade B PVR, 32.1% (17/53) had grade C1 PVR, 18.9% (10/53) had grade C2, 5.6% (3/53) had grade C3, and 1.9% (1/53) had grade D1 PVR and 1.9% (1/53) had grade D2 PVR, all according to the PVR categorization.

Fathalla et al. (2015) reported that there was no statistically substantial variation in the grading of PVR between the tested groups.[19]

Shah et al. (2018) found that ocular trauma (18.8%) was the second most common reason for using silicone oil after PVR (59.4%).[20]

In this study, we demonstrated that all of group A came back after 2 months to have oil removal, while among patients in group B there were 10 (40%) presented at 6 months, 5 (20%) presented between 6 and 12 months, and the rest presented after a year.

Tamponade lasted an average of 8.2 months (SD: 10.8). Most operations on eyes that had been tamponade for more than a year were performed at other facilities (6.25%). SOR was administered to 41 (64%) eyes within 6 months following tamponade. The average number of follow-up months was 2.9 (SD ± 3).

Shah et al. (2018) found that tamponade persisted for an average of 8.2 months (SD ± 10.8). The majority of operations on eyes with tamponade for more than a year were performed at other sites (6.25%). SOR was administered to 41 (64%) eyes within 6 months following tamponade. The average follow-up period was 2.9 months (SD ± 3).[20]

Ismail et al. (2019) separated the length of oil tamponade into four groups: less than 3 months (1.8%), between 3 and 6 months (12.7%), between 6 and 12 months (63.7%), and more than 12 months (21.8%). The majority (n = 35, 63.7%) had an oil tamponade for 6–12 months.[21]

Fathala et al. in 2015 found that patients from the early removal study said their removals occurred within 2 months of the plan. Despite the fact that patients were instructed to come back 6 months later, only eight (9 eyes) of the patients in the late

removal series did so. The remaining four patients returned between 6 and 12 months, 3 between 12 and 18 months, 2 between 18 and 24 months (3 eyes), and 2 patients (3 eyes) returned after 2 years.[22]

The study indicates a great statistically substantial variation between the study groups regarding cataract formation, with a statistically significant difference as regards intraocular pressure and oil emulsification.

Fathalla et al. (2015) found that cataract formation in two eyes (6%) in the early removal series and 14 eyes (63.6%) in the tardy remove series and they reported an occurrence of 19% of IOP increase in the early removal and 54% in the tardy removal series, while oil emulsification was reported to be increased among late removal series.[22]

Ismail et al. (2019) found that the shared complication of silicone oil tamponade was cataract formation (54.5%, n = 30), with a mean tamponade duration of 9.9 months (SD 5.0). Six of these eyes (10.9%), with a median tamponade length of 11.2 months, had secondary elevated IOP (SD ± 10.9). Three eyes (5.5%) had band keratopathy; their oil tamponade lasted an average of 12.8 months (SD ± 5.97) in these eyes.[21]

The study conducted reports the statistically significant difference between the duration of silicone oil tamponade and cataract formation, intraocular pressure, irritation of the anterior section, and oil emulsification.

Barack et al. studied the correlation of lens changes in three groups of patients who underwent SOR at different times in 2005. Of the patients, 30% had lens opacification in the group that used the silicone oil for 3 months, while 62.5% of patients had lens opacities in the second group, which used silicone for up to 6 months. In the third group using silicone for up to 9 months, 100% of patients developed lens opacity. Results show that early SOR has an important effect in reducing the progression and lens opacity because of silicone oil. While he found that in the first group of patients with silicone oil that was left in the eye for up to 3 months, there were 50% of eyes with somewhat increased ocular pressure but not exceeding 30 mmHg, and in the second and third group of patients this number was reduced to 16.7%. This result does not indicate the statistical significance between the time silicone oil is kept in and the increased ocular pressure with these patients ($P = 0.3$, $P > 0.05$).[23]

Fathalla et al. (2015) reported statistically significant difference between the duration of silicone oil tamponade and cataract formation, intraocular pressure, irritation of the anterior section, and oil emulsification.

After a pars plana vitrectomy, using a silicone oil tamponade may elevate intraocular pressure for a variety of reasons, such as inflammation, prior vitreoretinal surgery, and overfilling.

One of the main factors in increased intraocular pressure after vitrectomy is oil emulsification. The emulsification of the oil is accelerated by several factors, such as the existence of red blood cell membranes, plasma lipoproteins, and the water movement of the oil because of the high-speed vitreous cutting handpieces, which create shear forces.[22]

The study conducted demonstrated that there was statistically substantial variation between the study groups regarding intraocular pressure, IOP control, and remnants of oil after SOR.

Fathalla et al. (2015) showed that after SOR, there was substantial variation between the early removal series and late removal series as regards intraocular pressure, IOP control, and remnants of oil.

Intraocular pressure increased after SOR, in some cases because of a chronic reaction caused by emulsification as it is thought. The reaction of macrophages with emulsified silicone could in theory lead to increased intraocular pressure. The persistent increase in IOP after SOR may be because of the obstruction of the trabecular meshwork by the emulsified silicone.[22]

Elevated intraocular pressure caused by silicone oil may happen in both eyes phakic and aphakic because of the release of silicone oil fine particles in the anterior chamber and the forward migration of silicone oil-loaded macrophages from the posterior segment of the bubble resulting in obstruction of the trabecular meshwork.

Further studies should be conducted to determine the cause of silicone oil-induced increase in IOP and its relationship to removal time. These studies should include histopathological examination of the trabecular meshwork in patients having antiglaucoma surgery. This is particularly beneficial in patients with markedly undetectable silicone oil emulsification and in patients with unstable IOP elevations.

Another worrying complication of silicone oil is corneal decompensation and band keratopathy although the complication is usually little. Three of the patients who had chelation at the time of SOR presented with band keratopathy. However, the condition was reversible in both eyes which is why they did not require a corneal transplant. The complication being discussed happens when silicone oil contacts the corneal endothelium, resulting in decreased endothelial cell density and pleomorphism of the remained endothelial cells, causing

corneal edema and bullous keratopathy, stromal hypercellularity, superficial stromal calcification, and retro-corneal film development.

We concluded that in our early and late removal series, there was no important impact on refixation rates of the period of silicone oil tamponade. Early SOR at 2 months had a similar healing effect as planned removal at 6 months. In our rural community, patient adherence is higher with early planned removal. The longer delay before the oil is removed has led to major complications in certain patients.

5. Conclusion

In our early and late removal series, the time of silicone oil tamponade did not have an important impact on reattachment rates.

Early SOR at 2 months did have the same healing effect as planned removal at 6 months.

Early planned removal in our rural communities resulted in better patient compliance.

The longer delay before the removal of the oil has caused major complications in certain patients Figs. 1–4 Tables 1–6.

Disclosure

The authors have no financial interest to declare concerning the content of this article.

Authorship

All authors have a substantial contribution to the article.

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Conflicts of interest

There are no conflicts of interest.

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