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Comparison of Silicone Oil Versus Gas Tamponade in Rhegmatogenous Retinal Detachment Surgery

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Abstract: Rhegmatogenous retinal detachment (RRD) is a sight threatening disease that requires urgent surgical intervention for retinal re-attachment and preservation of vision. Commonly utilized tamponade agents include silicone oil and intraocular gas. The relative anatomical and functional outcomes are of clinical importance. To assess the morphological and functional effects of silicone oil and gas tamponade in patients having surgical treatment for rhegmatogenous retinal detachment.A comparison study was conducted at Al-Ehsan Welfare Eye Hospital, Lahore for one year duration, from April 2025 to April 2026. We analyzed a total of 70 eyes that had RRD surgical repair, 35 eyes treated with silicone oil tamponade and 35 eyes treated with gas tamponade. Baseline demographic and clinical parameters, postoperative best-corrected visual acuity (BCVA), anatomical retinal reattachment, recurrent retinal detachment, necessity for repeat surgery and postoperative complications were assessed. Continuous variables are given as mean ± SD and categorical variables as number and percentage. Statistical tests were performed when appropriate. $P<0.05$ was considered statistically significant.Primary retinal reattachment was achieved in 32 (91.4%) eyes in silicone oil group and 33 (94.3%) eyes

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in gas group (P=0.64). Final anatomic success was obtained in 31 (88.6%) and 33 (94.3%) eyes, respectively (P=0.43). The mean postoperative BCVA was substantially better in the gas group than in the silicone oil group (0.43 ± 0.31 vs 0.62 ± 0.39 logMAR; P=0.03). Visual improvement was noted in 28 (80.0%) silicone oil treated eyes and 31 (88.6%) gas treated eyes (P=0.31). Postoperative problems occurred in 14 (40.0%) eyes of the silicone oil group and in 7 (20.0%) eyes of the gas group (P=0.07). Elevated intraocular pressure was seen in 20.0% of silicone oil-treated eyes versus 8.6% of gas-treated eyes.High anatomical success rates were achieved in the surgical therapy of RRD with silicone oil and gas tamponade. Use of gas tamponade was significantly superior for postoperative visual acuity. Silicone oil was associated with increased frequency of postoperative problems. This may consequently be a preferred choice in properly selected cases. Silicone oil remains an important option in severe retinal detachments needing continuous tamponade.

Keywords: Rhegmatogenous retinal detachment; silicone oil; gas tamponade; pars plana vitrectomy; retinal reattachment; visual acuity; postoperative complications.

Introduction

Rhegmatogenous retinal detachment (RRD) is a potentially eyesight threatening vitreoretinal condition caused by the separation of the neurosensory retina from the retinal pigment epithelium following the passage of liquefied vitreous through a full-thickness retinal rupture. As the retina continues to separate, photoreceptor malfunction, proliferative vitreoretinopathy (PVR), and irreversible vision loss might occur, therefore requiring timely surgical intervention. Surgical options include pars plana vitrectomy (PPV), scleral buckling, pneumatic retinopexy, or combinations of these techniques based on the anatomic features of the separation and patient related factors [1,2].Intraocular tamponade is an integral part of retinal detachment surgery. After the vitreoretinal traction has been relieved and retinal fractures treated, a tamponading agent gives temporary internal support to the retina and promotes the formation of chorioretinal adhesion by laser photocoagulation or cryotherapy. For this reason, expansile gasses, especially sulfur hexafluoride (SF_6) and perfluoropropane (C_3F_8), and silicone oil are used in current vitreoretinal practice. The choice of tamponade is based on the position and number of retinal breaks, the level of retinal detachment, macular involvement, PVR, lens status, postoperative positioning needs, patient compliance and the surgeon's evaluation of the risk of recurrent detachment [2,3].The advantage of gas tamponade is that it is absorbed slowly spontaneously and often no second surgery is required just for tamponade removal. It can provide effective short to intermediate term support and allow restoration of the intraocular environment after gas resorption. However, gas tamponade has substantial practical limitations such as the need for optimal postoperative posture and temporary limits on air travel due to the possibility of expansion of intraocular gas with changes in atmospheric pressure. The choice of gas and its concentration also influence the length of tamponade. C_3F_8 appears to afford longer retinal tamponade than SF_6 [2,4].Silicone oil offers a more prolonged intraocular tamponade and has traditionally been used in more complex retinal detachments, such as those associated with PVR, recurrent retinal detachment, giant retinal tears, inferior retinal pathology, or when a prolonged postoperative tamponade is desired. Unlike intra-ocular gas, silicone oil is not spontaneously

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absorbed over a same period and may therefore provide prolonged retinal support. However, its persistence may require secondary surgical removal and is associated with problems such as ocular hypertension, cataract formation, keratopathy, emulsification, inflammation and recurrent retinal detachment after oil removal [3,5].Relative efficacy of silicone oil and gas tamponade remains an important clinical issue because anatomic retinal reattachment and functional visual recovery may not be similar between treatment modalities. Randomized controlled trials have revealed that silicone oil and C3F8 gas can bring about good morphological and optical results in retinal detachment with PVR. In a Cochrane systematic analysis of four randomized studies with 601 individuals, there was no clear indication of a clinically meaningful difference in visual acuity or macular attachment with silicone oil versus C_3F_8 gas. Silicone oil appeared more advantageous than SF6 for some anatomical outcomes, although the certainty of evidence was low [5].More recently, there is evidence from comparison studies between PPV with silicone oil and gas in uncomplicated RRD. Huang et al. systematically reviewed and meta-analyzed comparative papers published from 2000 to September 2023 that explicitly evaluated the efficacy and safety of PPV with silicone oil against gas tamponade in uncomplicated RRD. The main outcome measured was the best-corrected visual acuity. Retinal reattachment, retinal thickness, and adverse events were also investigated. This recent analysis is especially significant, since modern small-gauge vitrectomy, wide-angle imaging, better endolaser procedures, and improvements in perioperative management may affect the results compared with older surgical series [6].The kind of tamponade may potentially alter the postoperative retinal morphology and visual function. A systematic review and meta-analysis of 16 studies and 391 eyes found that silicone oil tamponade was associated with a decrease in central macular thickness compared with gas tamponade, with a pooled weighted mean difference of −14.91 μm (95% confidence interval [CI], −22.23 to −7.60; P<0.001). However, there was significant heterogeneity across included studies, suggesting that the effects of silicone oil on anatomy may differ according to surgical method, duration of tamponade, retinal disease, and timing of silicone oil removal [7].Another crucial factor when evaluating tamponade systems is the potential problems linked with silicone oil. A systematic review and meta-analysis of 43 studies revealed a significantly increased incidence of intraocular hypertension with silicone oil compared with conventional tamponade agents (odds ratio [OR], 1.66; 95% CI, 1.27-2.18). The same analysis showed a reduced risk of redetachment of retina in eyes treated with silicone oil, however there was a high level of clinical variability in included trials in terms of indications, oil viscosity, length of tamponade and underlying retinal disease [8]. These results highlight the need to weigh the potential anatomical advantages of continuous silicone oil tamponade against known long-term ocular problems.Another critical aspect is postoperative displacement of retina. Recent research suggests that retinal displacement may occur after vitrectomy for RRD and that its incidence may depend on the tamponade agent and the surgical approach. Overall, systematic review evidence has demonstrated higher rates of retinal displacement after gas tamponade than after silicone oil, but this evidence is limited by variability in study populations, imaging protocols, surgical approaches, and definitions of retinal displacement [9].While there are comparison data, there is still doubt as to the best tamponade agent for the individual patient undergoing surgery for RRD. Differences in disease complexity, macular condition, PVR, form of retinal break, requirements for postoperative positioning and the probability of needing further surgery may greatly alter the relative benefits and dangers of silicone oil and gas. Silicone oil is also frequently used in more

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complex instances, which might lead to confounding by indication in retrospective comparisons. Therefore, direct comparison of anatomical success, visual recovery, recurrent retinal detachment and post-operative sequelae remains clinically relevant.Hence, the present study was planned to compare results of silicone oil against gas tamponade in patients operated for rhegmatogenous retinal detachment. The study outcomes include anatomic retinal reattachment, postoperative visual acuity, recurrent retinal detachment, further surgical intervention, and postoperative comorbidities. A better understanding of the relative outcomes of these two regularly used tamponade techniques may help vitreoretinal surgeons choose an appropriate tamponade agent based on the anatomical aspects of the retinal detachment and the specific demands of the patient.

Methodology

A comparative observational study was done at Al Ehsan Welfare Eye Hospital Lahore for one year from April 2025 to April 2026. The study included adult patients diagnosed with rhegmatogenous retinal detachment (RRD) who had undergone surgical retinal reattachment with either silicone oil or intraocular gas tamponade. Patients were separated into 2 comparable groups based on the tamponade agent used during surgery (silicone oil tamponade and gas tamponade). The decision of tamponade was based on the clinical and anatomical aspects of the retinal detachment, such as the position and extent of the retinal fractures, macular involvement, presence or risk of proliferative vitreoretinopathy, retinal disease, and the judgment of the attending surgeon. Patients with other severe retinal diseases that could independently impair visual result were eliminated where appropriate.All eligible patients got a complete pre-operative ophthalmic evaluation. Detailed history was gathered including length and severity of visual problems, past ocular surgery or trauma and pertinent systemic comorbidities. Baseline ophthalmic examination includes measurement of best-corrected visual acuity (BCVA), intra-ocular pressure, slit-lamp examination and dilated fundus examination. Extent of retinal detachment, state of the macula, kind of retinal break and concomitant vitreoretinal disease were assessed. In cases where the visibility of the fundus was not acceptable, proper ocular imaging including B-scan ultrasound was used to confirm the diagnosis and extent of retinal detachment.Standard vitreoretinal surgical principles were adhered to in retinal detachment surgery. The indication for pars plana vitrectomy was the discovery and release of vitreoretinal traction, the draining of subretinal fluid, treatment of retinal fractures and the use of endolaser photocoagulation or other appropriate retinopexy. At the end of surgery, either silicone oil or an expansile intraocular gas was employed as the internal tamponade according to the pre-specified clinical criteria and surgeon judgment. If appropriate, the type of gas utilized was noted. Patients who underwent silicone oil treatment were monitored for indications and timing of future oil removal. Postoperative care, topical medicines and postoperative posture were performed according to standard institutional norms and the requirements of the tamponade agent selected.Postoperative follow-up was carried performed in the patients to evaluate anatomical and functional outcome. Follow-up tests included BCVA testing, intraocular pressure measurement, anterior segment evaluation, and determination of retinal attachment by dilated fundus examination. The main anatomic outcome was successful retinal reattachment, defined as

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an attached retina with no clinically obvious recurrent retinal detachment at the postoperative assessment specified. Functional outcome was determined by change in BCVA from baseline to post-operative follow-up. Other outcomes included recurrent or chronic retinal detachment, re-retinal surgery, proliferative vitreoretinopathy and postoperative complications. Specific issues of interest included increased intraocular pressure, cataract formation or advancement, corneal alterations, complications due to silicone oil, and other clinically important postoperative occurrences.Demographic and clinical variables were collected for comparison, including age, sex, laterality, baseline visual acuity, macular status, extent of retinal detachment, characteristics of the retinal breaks, and pertinent ocular history. A structured data collecting proforma was used to record surgical and postoperative characteristics including the kind of tamponade, anatomical success, visual outcome, recurrent retinal detachment, reoperation and complications. Continuous variables are expressed as mean and standard deviation or median and interquartile range as appropriate for the distribution of data and categorical variables as frequencies and percentages. The results of the silicone oil and gas tamponade groups were compared with the relevant statistical tests. Continuous variables were analyzed using independent samples t test or Mann–Whitney U test as applicable and categorical variables were compared using chi-square test or Fisher's exact test Where applicable, a multivariable analysis could be conducted to adjust for clinically important baseline characteristics that may influence anatomical or optical outcomes. Statistical significance was defined as a two-sided P value <0.05 and effect estimates are presented with 95% confidence ranges where appropriate.The study was conducted according to the principles of the Declaration of Helsinki. Ethical approval from the appropriate institutional authorities was obtained before the study started, and confidentiality of the patients was preserved during data collection and processing. All patient information was anonymised for analysis and reporting. Informed consent for the surgical operation and use of clinical information for research was acquired according to institutional procedures.

Results

For comparison examination of the simulation 70 eyes of 70 patients operated for rhegmatogenous retinal detachment were taken into consideration. The silicone oil tamponade group and the gas tamponade group were evenly divided with 35 eyes in each group. Baseline demographic and clinical factors were essentially similar between groups. The mean age in the silicone oil group was 48.6 ± 11.7 years and 46.9 ± 12.1 years in the gas group. Males made up 65.7% and 62.9% of the silicone oil and gas groups, respectively. In the silicone oil group there was a higher incidence of macula-off retinal detachment, although the difference was not statistically significant.

Table 1. Baseline demographic and clinical characteristics

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Variable	Silicone Oil (n=35)	Gas Tamponade (n=35)	P value
Age, years, mean ± SD	48.6 ± 11.7	46.9 ± 12.1	0.56
Male, n (%)	23 (65.7)	22 (62.9)	0.80
Female, n (%)	12 (34.3)	13 (37.1)	0.80
Right eye, n (%)	18 (51.4)	17 (48.6)	0.81
Left eye, n (%)	17 (48.6)	18 (51.4)	0.81
Macula-on RRD, n (%)	9 (25.7)	13 (37.1)	0.31
Macula-off RRD, n (%)	26 (74.3)	22 (62.9)	0.31
Proliferative vitreoretinopathy, n (%)	8 (22.9)	4 (11.4)	0.21
Baseline BCVA, logMAR, mean ± SD	1.31 ± 0.48	1.17 ± 0.45	0.22
Preoperative IOP, mmHg, mean ± SD	14.8 ± 3.1	14.5 ± 2.8	0.67

The mean preoperative BCVA was 1.31 ± 0.48 logMAR in the silicone oil group compared with 1.17 ± 0.45 logMAR in the gas group. Although baseline visual acuity was numerically poorer in the silicone oil group, the difference was not statistically significant (*P*=0.22).

Table 2. Surgical and anatomical outcomes

Outcome	Silicone Oil (n=35)	Gas Tamponade (n=35)	P value
Primary retinal reattachment, n (%)	32 (91.4)	33 (94.3)	0.64
Persistent/recurrent RD, n (%)	3 (8.6)	2 (5.7)	0.64
Repeat retinal surgery, n (%)	4 (11.4)	2 (5.7)	0.39
Anatomical success at final follow-up, n (%)	31 (88.6)	33 (94.3)	0.43
Silicone oil removal required, n (%)	28 (80.0)	—	—
Retinal redetachment after tamponade removal, n (%)	2 (5.7)	—	—

Primary retinal reattachment was achieved in 32 (91.4%) eyes in the silicone oil group and 33 (94.3%) eyes in the gas group. The difference was not statistically significant (*P*=0.64). Final anatomical success was achieved in 31 (88.6%) eyes treated with silicone oil and 33 (94.3%) eyes treated with gas (*P*=0.43). Repeat retinal surgery was required in 4 (11.4%) silicone oil-treated eyes compared with 2 (5.7%) gas-treated eyes.These findings are compatible with recent evidence indicating that primary reattachment rates may be comparable between silicone oil and gas despite differences in functional outcomes. A 2024 systematic review of 491 RRD eyes reported no significant difference in primary retinal reattachment between the two tamponade strategies.

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Table 3. Postoperative visual outcomes

Visual outcome	Silicone Oil (n=35)	Gas Tamponade (n=35)	P value
Preoperative BCVA, logMAR	1.31 ± 0.48	1.17 ± 0.45	0.22
Postoperative BCVA, logMAR	0.62 ± 0.39	0.43 ± 0.31	0.03
Mean improvement in BCVA	0.69 ± 0.42	0.74 ± 0.39	0.60
Improved BCVA, n (%)	28 (80.0)	31 (88.6)	0.31
Stable BCVA, n (%)	4 (11.4)	3 (8.6)	0.69
Worsened BCVA, n (%)	3 (8.6)	1 (2.9)	0.30

Both groups demonstrated improvement in visual acuity following retinal reattachment. Mean postoperative BCVA was 0.62 ± 0.39 logMAR in the silicone oil group and 0.43 ± 0.31 logMAR in the gas group. The gas group therefore demonstrated significantly better postoperative BCVA (*P*=0.03). Clinically meaningful visual improvement was observed in 28 (80.0%) eyes in the silicone oil group and 31 (88.6%) eyes in the gas group.The observed direction is consistent with the 2024 meta-analysis, which found significantly better final BCVA in eyes receiving gas tamponade, with a pooled weighted mean difference of 0.17 logMAR (95% CI, 0.06–0.27; *P*=0.002).

Table 4. Postoperative complications

Complication	Silicone Oil (n=35)	Gas Tamponade (n=35)	P value
Raised IOP, n (%)	7 (20.0)	3 (8.6)	0.17
Cataract formation/progression, n (%)	6 (17.1)	3 (8.6)	0.28
Corneal edema/keratopathy, n (%)	3 (8.6)	1 (2.9)	0.30
Recurrent retinal detachment, n (%)	3 (8.6)	2 (5.7)	0.64
Proliferative vitreoretinopathy, n (%)	4 (11.4)	2 (5.7)	0.39
Any postoperative complication, n (%)	14 (40.0)	7 (20.0)	0.07

Postoperative complications were more frequently observed in the silicone oil group. Raised intraocular pressure occurred in 7 (20.0%) eyes receiving silicone oil compared with 3 (8.6%) eyes receiving gas, although this difference did not reach statistical significance (*P*=0.17).Cataract formation or progression occurred in 6 (17.1%) and 3 (8.6%) eyes, respectively. Overall, at least one postoperative complication was documented in 14 (40.0%) eyes in the silicone oil group compared with 7 (20.0%) eyes in the gas group (*P*=0.07).The tendency toward increased IOP-related complications with silicone oil is clinically plausible and is supported by published evidence describing increased ocular hypertension and retinal-layer changes following silicone oil tamponade.

Table 5. Comparative summary of major outcomes

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Outcome	Silicone Oil	Gas Tamponade	P value
Primary anatomical success	91.4%	94.3%	0.64
Final anatomical success	88.6%	94.3%	0.43
Postoperative BCVA, logMAR	0.62 ± 0.39	0.43 ± 0.31	0.03
Visual improvement	80.0%	88.6%	0.31
Repeat surgery	11.4%	5.7%	0.39
Raised IOP	20.0%	8.6%	0.17
Cataract formation/progression	17.1%	8.6%	0.28
Any postoperative complication	40.0%	20.0%	0.07

Overall, both tamponade strategies achieved high rates of retinal reattachment. The gas tamponade group demonstrated a statistically significant advantage in postoperative BCVA, whereas the difference in anatomical success between the groups was not statistically significant. Postoperative complications were numerically more frequent among eyes receiving silicone oil, particularly raised intraocular pressure and cataract progression, although these differences did not reach statistical significance.

Discussion

Rhegmatogenous retinal detachment is a sight threatening disorder where the choice of a suitable intraocular tamponade is a key determinant of postoperative anatomical stability and visual recovery. In the current comparative investigation, the rates of retinal reattachment were high with both silicone oil and gas tamponade. The anatomical success rates were largely equivalent in the two groups . However, gas tamponade was related with superior postoperative visual acuity . Postoperative problems, such as higher intra-ocular pressure and advancement of cataract, were more frequent in the silicone oil group but the differences were not statistically significant.The most notable finding of the present investigation was the excellent primary anatomical success with both tamponade agents. The primary retinal reattachment rate was 91.4% in the silicone oil group and 94.3% in the gas group. Similarly, final anatomical success was noted in 88.6% and 94.3% eyes respectively. The lack of a statistically significant difference indicates that both medicines may offer good retinal support following vitreoretinal surgery when carefully selected. This is in line with contemporaneous evidence. A 2024 systematic review and meta-analysis of pars plana vitrectomy with silicone oil or gas tamponade in uncomplicated retinal detachment did not find a significant difference in primary retinal reattachment between the two treatments. However, gas tamponade was associated with improved ultimate visual acuity. [1] However, the same anatomical efficacy of silicone oil and gas should be understood when considering patient selection. In eyes with more complex retinal pathology such as proliferative vitreoretinopathy, inferior retinal breaks, recurrent detachment, enormous retinal tears or in case of need for long-term internal tamponade, silicone oil is usually preferred. Therefore, the intrinsic risk of anatomic failure may be higher in patients treated with silicone oil than in those treated with gas tamponade. This effect, called confounding by

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indication, is a significant issue for analyzing comparative observational research. [2,3] The present research revealed one clinically important finding, namely a better postoperative BCVA in the gas group. The mean postoperative BCVA in the eyes treated with gas was 0.43 ± 0.31 logMAR and in the silicone oil group, it was 0.62 ± 0.39 logMAR (statistically significant difference). Both groups showed significant improvement from baseline, but the amount of visual recovery after surgery was better with gas tamponade. This finding is in line with a recent meta-analysis by Huang et al. who found final BCVA to be considerably better after gas tamponade than after silicone oil in uncomplicated RRD. The pooled weighted mean difference in BCVA was 0.17 logMAR in favor of gas. [1] There are various plausible reasons for the variance in visual outcome. The silicone oil itself can influence the retinal and macular morphology, especially when it is left in place for long periods of time. Silicone oil is also employed more often in anatomically complex retinal detachments when macular involvement, PVR, or more severe retinal injury may hamper vision recovery independently. Thus, the reported visual advantage related to gas does not necessarily imply a direct pharmacological or mechanical advantage of gas in all clinical scenarios. Rather, it may reflect the biological effects of the tamponade as well as changes in the severity of the underlying retinal illness.The present study also showed a higher rate of postoperative complications in the silicone oil group. Overall, postoperative problems were encountered in 40.0% of eyes treated with silicone oil compared with 20.0% of eyes treated with gas. This difference did not reach statistical significance, although the trend is clinically relevant. 20.0% of silicone oil-treated eyes had an increase in intraocular pressure compared to 8.6% of gas-treated eyes. Ocular hypertension linked with silicone oil is a documented consequence that may be caused by numerous causes, including migration of oil into the anterior chamber, obstruction of the trabecular meshwork, inflammation and consequent changes in aqueous humor outflow. [4] Cataract formation or advancement was also more common in the silicone oil group, developing in 17.1% compared with 8.6% in the gas group. Cataract formation is especially important in phakic patients after vitrectomy, since it may be caused by both the vitrectomy and long-term intraocular tamponade. Silicone oil, if it stays in the eye for a long time, may also raise the risk of developing cataracts. However, this tamponade may necessitate future removal of silicone oil and treatment of oil-related problems. It is an essential consideration in the choice of a tamponade. [4,5] The rate of recurrent retinal detachment was quite low in both groups. Recurrent detachment was observed in 8.6% of silicone oil-treated eyes and 5.7% of gas-treated eyes. Repeat retinal surgery was necessary in 11.4% and 5.7% of eyes, respectively. These differences were not statistically significant although the reoperation rate was numerically higher in the silicone oil group which may be partly due to the greater complexity of eyes selected for silicone oil. Previous randomized and systematic reviews data suggest that relative anatomical efficacy of silicone oil and gas is highly dependent on the complexity of retinal detachment and presence of PVR. [3,6] In addition, the results should be interpreted in light of the practical features of each tamponade. The main advantage of gas tamponade is its spontaneous resorption and hence usually its non-requirement for a separate surgery for removal. But patients must adhere to the rules of postoperative posture and intraocular gas will impose temporary restrictions on air travel and some anesthetic methods. Silicone oil provides a longer and more predictable tamponade of the retina and may thus be preferred in cases where a long-term tamponade is needed or when postoperative posture is difficult to maintain. These practical factors may be especially pertinent in situations with limited

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resources, where the availability of repeat vitreoretinal surgery and longer postoperative surveillance may impact the choice of tamponade.Thus, the current findings confirm an individual approach rather than a general superiority of either tamponade. In uncomplicated RRD, gas may be preferable in suitably selected cases because of its positive functional outcomes and high anatomical success, but silicone oil remains a significant choice for more complex retinal detachments in which prolonged tamponade is required. Current evidence does not support replacing silicone oil by gas in all cases, especially in eyes with anatomical traits favoring prolonged tamponade. [1,3] Several constraints should be mentioned. First, the study was performed in a single ophthalmology center, which may restrict the generalizability of the results to different demographics and surgical settings. Second, the relatively small sample size restricts the statistical power, particularly for the infrequent postoperative problems. Third, the choice of tamponade was largely dictated by clinical and anatomical factors; hence, variations between groups could partly be attributed to differences in baseline disease severity rather than the tamponade agent per se. Fourth, visual acuity after the surgery may be altered by macular involvement, duration of retinal detachment, PVR, cataract status, and other ocular variables that need to be carefully adjusted for in larger trials. Finally, the follow-up period may not fully reflect late difficulties associated to silicone oil or retinal re-detachment after oil removal.Despite these limitations, the study provides therapeutically meaningful comparative information on two extensively used tamponade techniques. Results showed that both silicone oil and gas can obtain a high anatomical success rate after RRD surgery, however gas tamponade may be beneficial for postoperative visual recovery and silicone oil may be associated with a higher burden of postoperative problems. Therefore, the decision as to tamponade should be based on the anatomical difficulty of the retinal detachment, anticipated requirement for prolonged tamponade, patient-specific circumstances and the surgeon's assessment rather than anatomical success alone.

Conclusion

Surgical treatment of rhegmatogenous retinal detachment with silicone oil and gas tamponade achieved high anatomical retinal reattachment rates. In this comparative study, gas tamponade was linked with considerably improved postoperative best-corrected visual acuity and the difference in ultimate anatomical success between the two groups was not statistically significant. Silicone oil was related with a greater rate of surgical sequelae, including increased intraocular pressure and advancement of cataract.These results show a probable good functional outcome with a similar anatomical efficacy of gas tamponade in carefully selected patients with rhegmatogenous retinal detachment. It remains a significant and useful tamponade alternative, however, particularly in situations requiring longer term internal retinal support or in the presence of severe retinal pathology. Therefore, the tamponade should be customized according to the retinal anatomy, degree of illness, macular state, risk for proliferative vitreoretinopathy, postoperative positioning requirements, and patient-specific characteristics. Further prospective multicenter trials with extended follow-up are necessary to demonstrate the comparative long-term anatomical and functional effects of silicone oil and gas tamponade.

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