Original Article

Comparison of Three Port and Two Port Technique of Silicone Oil Removal

Muhammad Arif, Qamar Mehboob, Muhammad Younis Tahir

ABSTRACT

Objective: This study was conducted to see whether the three port or two port technique is better to remove the silicone oil in patients who have undergone pars plana vitrectomy and silicone oil injection for the treatment of retinal detachment more than three months ago. **Study Design:** It was a prospective interventional study. **Place & Period of study:** Conducted in Ophthalmology Departments of Mayo Hospital, KEMU Lahore and Allied Hospital, Punjab Medical College Faisalabad from July 2012 to July 2014. **Materials and Methods:** Total fifty patients were included in this study, aging from 19 to 71 years with an average of 43.71 years. They had undergone pars plana vitrectomy with silicone oil endotamponade, more than three months ago. Prophylactic 360^0 laser had been applied to all these cases. These patients were divided into two main groups, A and B, each group comprising of twenty five patients. In group A silicone oil was removed by using three port technique and in group B by two port technique. All patients were examined on the first postoperative day and then after one month. The final best corrected visual acuity was checked postoperatively by Snellen's chart one month after silicone oil removal. **Results:** On first postoperative day, in group A all patients had attached retina, no silicone oil bubble seen in vitreous cavity while there were few microdroplets of silicone oil. After one month best corrected visual acuity (BCVA) of operated side was on average 0.17, from minimum 0.03 to maximum 0.33. In group B all patients had attached retina, slightly more microdroplets of silicone oil in the vitreous cavity. Two patients (8%) had a part of silicone oil remaining behind in the vitreous cavity. So we had to operate again these patients to remove the last bubble of silicone oil. After one month BCVA of operated side was on average 0.12, from minimum 0.05 to maximum 0.25. **Conclusion:** The three port technique of silicone oil removal looks to be a better one. The ultimate best corrected visual acuity was slightly better with this technique and there were few microdroplets of silicone oil in vitreous cavity as compared with two port technique. **Key words:** Silicone Oil Removal, Visual Acuity, Glaucoma.

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INTRODUCTION

Silicone oil is commonly used in vitreo-retinal surgical procedures. It provides long term endotamponade in cases of complicated retinal detachment.

Corresponding Author:
Dr. Muhammad Arif
Assistant Professor of Ophthalmology
PMC / Allied Hospital, Faisalabad
Tel. +92 301-7052757
E-mail: arifsaleem1986@yahoo.com

At the same time it can cause some harmful complications like cataract, glaucoma, band keratopathy or inverse hypopyon[1]. It is generally removed after three months or more if the retina remains attached.

Different techniques are used for silicone oil removal (SOR). Some surgeons use two port and other use three port technique for this purpose[2,3]. In our study we compared the advantages and disadvantages of two port and three port

techniques in an attempt to see which is the better technique out of these two.

Study Design:

It was a prospective, interventional study conducted in Ophthalmology departments of Mayo hospital, King Edward medical university Lahore and Allied hospital, Punjab medical college Faisalabad from July 2012 to July 2014.

Inclusion Criteria:

- All patients who have undergone pars plana vitrectomy with silicone oil injection more than 3 months ago and had attached retina.
- Patients who have persistent higher intraocular pressure.
- Patients having band keratopathy.

Exclusion Criteria:

- Patients not willing for another surgical procedure.
- Patients with acute infection of ocular tissues or adenexa.

MATERIALS & METHODS

In this study total fifty cases were included. There were 28 males and 22 females. The age of the patients was between 19 and 71 years with an average of 43.71 years. All patients had undergone standard three port pars plana vitrectomy (PPV) with silicone oil injection as endotamponade more than three months ago. In all these patients prophylactic 360 degrees laser had been applied. A written consent was taken from every patient. Complete history was taken and a thorough clinical examination was done with special emphasis on retinal status. Those patients were excluded from the study who had undergone PPV less than three months ago or were not willing for silicone oil removal.

The patients were divided into two main groups; A and B each group comprising of twenty five patients. In group A the silicone oil was removed by three port technique while in group B two port technique was used.

In group A, three 20G sclerotomies were made. Infusion cannula was attached at inferotemporal region and fixed with the help of 6/o vicryl (polyglactin) suture. The other two ports were used for removal of silicone oil. The infusion line kept "on" to irrigate the vitreous cavity and silicone oil came out through the upper two ports. It was tried to remove the silicone oil in a passive manner by opening the sclerotomy with the help of corneal forceps and / or increasing the height of infusion bottle. When it was felt that the whole silicone oil has come out then multiple fluid air exchanges were done to remove the last bubble of remaining silicone oil. After that complete 360 degrees examination of retina was done. If any, new or old, open retinal break was seen then endolaser was applied around that break. If any sub silicone retinal membrane was seen, that was removed. All three ports and peritomies were closed with the help of 6/0 vicryl (polyglactin) suture. A subconjunctival injection of 0.5 ml gentamicin and 0.5 ml dexamethasone was given.

In group B, 20 G two port technique was used for silicone oil removal (SOR). The infusion cannula was fixed at inferotemporal quadrant and another sclerotomy was made at superotemporal quadrant for SOR. The whole silicone oil was removed through the upper port in passive manner. No further surgical procedure was done. Then both ports and peritomy was stitched with 6/0 vicryl (polyglactin) suture. A subconjunctival injection of 0.5 ml gentamicin and 0.5 ml dexamethasone was given.

All patients were examined on next postoperative day. A complete examination of anterior and posterior segment was done. A special attention was given to the state of the retina whether attached or detached. Any part of silicone oil remained behind in the vitreous cavity or not. Any microdroplets of silicone oil seen or not in the vitreous cavity.

The patients of both groups were re-examined in detail after one month and best corrected visual acuity was recorded with the help of Snellen's chart.

RESULTS

All patients of group A were found on next day with attached retina. The conjunctiva was slightly more inflamed. No patient had silicone oil bubble in the vitreous cavity. There were minimal silicone oil microdroplets in the vitreous cavity. After one month BCVA of operated side was from 0.03 to 0.33 with an average of 0.17.

In group B, all the patients were examined with the help of slit lamp bio-microscope on first postoperative day. All of them had attached retina and relatively more silicone oil micro droplets seen in the vitreous cavity on slit lamp examination. Two patients out of twenty five (8%) were found with big silicone oil bubble in the superior part of vitreous cavity. These patients had to undergo another surgery for removal of remaining silicone oil. After one month BCVA of operated side was from 0.05 to 0.25 with an average of 0.12.

Descriptive

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
BCVA gp A	25	0.03	0.33	0.17	0.07
BCVA gpB	25	0.05	0.25	0.12	0.06
Valid N (list wise)	25				

T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
BCVA gp A	25	0.17	0.07	0.015
BVCAgp B	25	0.12	0.06	0.012

One-Sample Test

	Test Value = 0					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
BCVA gp A	11.38	24	0.00	0.17	0.14	0.20
BCVA gpB	9.29	24	0.00	0.12	0.09	0.14

Correlations

		BCVAgp A	BCVAgp B
gp A	Pearson Correlation	1	0.820**
	Sig. (2-tailed)		0.000
	N	25	25
gpB	Pearson Correlation	0.820**	1
	Sig. (2-tailed)	0.000	
	N	25	25

**. Correlation is significant at the 0.01 level (2-tailed).

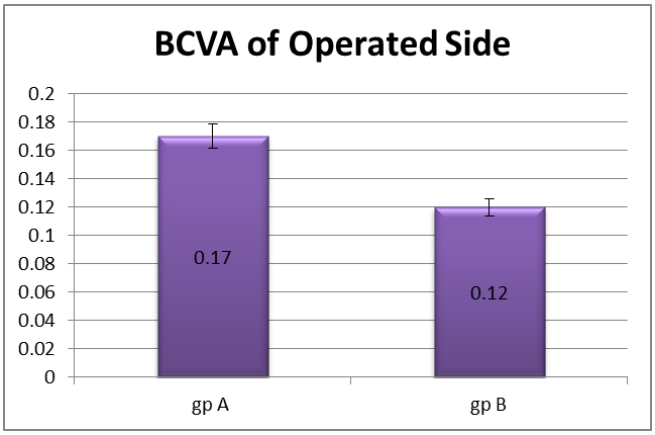

Figure 1: Graphical presentation of results of BCVA of operated side

DISCUSSION

Silicone oil is commonly used as endotamponade during the treatment of many complicated cases of retinal detachment all over the world. It is usually removed after three to six months to avoid its complications like cataract, glaucoma, band keratopathy and oil emulsification[1].

Different techniques are used for SOR. Every technique has some advantages and some disadvantages. Most of the vitreo-retina surgeons use two port or three port technique for this porpose[2-8]. Multiple studies have been conducted all over the world in an attempt to see which technique is the best one.

In our study we compared the results of two port and three port technique. We noticed that the former technique is relatively less traumatic to the patient because we can complete the whole procedure by making only two sclerotomies. So relatively less conjunctival inflammation was seen in this group. At the same time we noticed that after this procedure more silicone oil micro-droplets were found in the vitreous cavity of all the patients of this group. In 8% cases last bubble of silicone oil could not be removed and we had to operate again for this purpose. Furthermore the average BCVA was slightly less as compared with group A.

The three port technique looks slightly more traumatic for the patients. There was slightly more conjunctival inflammation seen in these patients. But postoperatively we noticed relatively much less micro-droplets of silicone oil in vitreous cavity. In this group we did not have to re-operate any case for SOR because we were able to visualize the last bubble of silicone oil and removed it under direct vision. Final average BCVA was better with this technique. So according to our study three port technique of SOR looks to be a relatively better one as compared with the two port technique.

Tan H et al compared the results of two port and three port SOR. They have reported that after two port SOR retinal re-detachment was seen in 16.8% and after three port SOR it was 19.2% which was not statistically significant. There was a significantly higher retinal re-detachment rate in cases with a short oil tamponade duration < 2 months[2].

Oh H et al recently published the results of their slightly different but simple technique of silicone oil removal. They used 23 G transconjunctival cannula attached to external vaccum pump. They reported that with this technique 1000 cSt silicone oil can be removed within 1 to 2 minutes while 5700 cSt within 7 to 8 minutes safely and very easily[4].

Choudhry A et al conducted a study and introduced a very easy and effective technique of SOR. They used 23 gauge three port technique for this purpose. After making three 23G ports, they inserted a 23G syringe needle in the infusion bottle and the other end of that needle was attached with the air supply tube of vitrectomy machine. The air pressure was set about 60 mm Hg. The other two 23G ports were used for passive silicone oil removal. They reported that it is a very safe and cost effective technique[5].

Cekic O et al described another simple three port passive SOR technique. They increased the pressure in infusion line by simply increasing the height of infusion bottle. The other two 23G ports were used to remove silicone oil with an externally applied cotton swab. No retinal re-detachment or other procedure related complication seen[6].

Manish et al described hybrid technique in which they used slightly different variant of 23G three port technique. They used two sclerotomies of 23G size for infusion and light pipe while the third port was made of 20G for oil removal. They concluded that hybrid technique is very safe and

effective. On the basis of their experience with hybrid technique they described that endolaser barrage , presence of encircling scleral buckle and combination of the two are determining factors of retinal re-detachment rate[7].

Jian-Qin L et al described a slightly different two port technique which they called mixed technique for SOR. In that study they used one 23G port for infusion and another 20G port for SOR. They have concluded that mixed technique is better as compared with routine two port 20G technique because after mixed technique retinal re-detachment occurred in 6.9% cases while after both 20G sclerotomies it was 17.2%[8].

Arikan G et al studied the changes in central corneal thickness (CCT) after SOR through pars plana in pseudophakic eyes and through limbal incision in aphakic eyes. In that study on average preoperatively CCT was 576.4± 46.0 in pseudophakics and 611.0±36.2 microns in aphakiceyes. Postoperatively these readings were 582.7 ± 49.5 and 614.5 ± 82.4 microns at three months after SOR[9].

Azamina M et al conducted a study to see ERG changes after SOR. They have reported that the amplitude of ERG 'a' and 'b' waves under scotopic and photopic conditions increased significantly shortly after SOR. An increase in BCVA was also noted. These changes may be explained by the insulating effect of silicone oil on the retina[10].

Jahangir K used two port technique in 47 patients and completed the follow up for six months. He has reported that after two port SOR retinal re-detachment occurred in 14 out of 47 (29.79%) cases during the first three months of follow up[11].

Khurram D et al used three port SOR technique and reported 38% retinal re-detachment during one year of follow up[12].

Avitabile T et al conducted a very important study in which they evaluated the role of 360˚ laser retinopexy. They included 303 patients in that study and divided them into two main groups, experimental and control group. In 151 cases of experimental group they applied 360˚ laser (93 cases during primary vitrectomy and in 58 cases after vitrectomy) and in control group of 152 cases they did not apply 360˚ laser. Then after at least 4 months stable attached retina they removed silicone oil from both groups and compared the outcome. They reported only 8.63% re-detachment posterior to laser treatment while in control group without 360˚ laser the re-detachment was seen in 20.93% cases. They have concluded that 360˚ laser retinopexy reduces the incidence of retinal re-detachment after silicone oil removal and it should be completed intraoperatively[13].

CONCLUSION

On completion of this study and comparing the results with other national and international studies we reached to this conclusion that removal of silicone oil is a very important part of management of retinal detachment cases. Three port technique is comparatively better as compared with the two port technique. Although it looks more traumatic to the patient but the ultimate BCVA was seen better with this technique and relatively few micro-droplets of silicone oil were seen in vitreous cavity. We can examine 360˚ retina and, if needed, we can do other procedures like endolaser around new or old open retinal breaks and can remove sub-silicone oil membranes. Further long term studies are required to see the role of different prophylactic measures like 360˚ laser and scleral buckling during the primary pars plana vitrectomy for better outcomes of silicone oil removal.

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AUTHORS

- **Dr. Muhammad Arif**
  Assistant Professor, Ophthalmology
  PMC / Allied Hospital, Faisalabad
- **Dr. Qamar Mehboob**
  Assistant Professor, Physiology
  Independent Medical College, Faisalabad
- **Dr. Muhammad Younis Tahir**
  Assistant Professor, Ophthalmology
  Bahawal Victoria Hospital,
  QAMC, Bahawalpur

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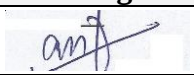
AUTHORSHIP AND CONTRIBUTION DECLARATION

Name of Author	Contribution to the paper	Author's Signatures
Dr. Muhammad Arif	1st Author	
Dr. Qamar Mehboob	2nd Author	
Dr. Muhammad Younis Tahir	3rd Author