



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

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**Purpose:** This study was conducted to see which technique is better to remove the silicone oil.

**Study Design:** It was a prospective study conducted in ophthalmology departments of Mayo hospital, KEMU Lahore and Allied hospital, Punjab medical college Faisalabad from January 2012 to July 2012 at the same time.

**Materials and methods:** Total fifty patients were included in this study who had undergone pars plana vitrectomy with silicone oil endotamponade more than three months ago. These patients were divided into two main groups; A and B each group comprising of twenty five patients. In group silicone oil was removed by using three port technique and in group B by two port technique. All patients were examined on the operation table and on first postoperative day.

**Results:** In group A, all patients had attached retina, no silicone bubble seen in vitreous cavity. Conjunctival inflammation was slightly more but in the vitreous cavity there were few microdroplets of silicone oil.

In group B all patients had attached retina, less conjunctival inflammation but 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.

**Conclusion:** Although three-port technique is relatively more traumatic to the patients but overall it is a better technique because even the last bubble of silicone oil can be visualized and removed under direct vision. Furthermore, if needed, other surgical procedures can be performed like endolaser or membrane peeling so the chances of postoperative complications like retinal re-detachment can be minimized.



## **Introduction:**

Silicone oil is commonly used in vitreo-retinal surgical procedures. It provides long term endotamponade in cases of complicated retinal detachment. At the same time it can cause some harmful complications like cataract, glaucoma, band keratopathy or inverse hypopyon<sup>1</sup>. It is generally removed after three months 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<sup>2-11</sup>. In aphakic patients some surgeons use even one port technique<sup>12</sup>. In our study we compared the advantages and disadvantages of two port and three port techniques in an attempt to determine the better technique out of these two.

## **Materials and Methods:**

In this study total fifty patients 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 endotamponade. 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 6/0 vicryl suture. The other two ports were used for light pipe and SOR. The infusion line was kept "on" to irrigate the vitreous cavity and silicone oil came out mainly through the right port. 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 the break. If any sub silicone retinal membrane was seen that was removed. All three ports were

closed with the help of 6/0 vicryl suture. The peritomies were stitched with 6/0 vicryl suture. A subconjunctival injection of 0.5 ml gentamycin and 0.5 ml dexamethasone was given.

In group B, 20G two port technique was used for silicone oil removal. The infusion cannula was fixed at inferotemporal quadrant and another sclerotomy was made at superotemporal quadrant for SOR. No further procedure was done.

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 retina whether attached or detached, any part of silicone oil remained behind in the vitreous cavity or not and whether any micro droplets of silicone oil seen or not.

## **Results:**

All patients of group A were found on the operation table with attached retina. On next postoperative day all patients had attached retina. The conjunctiva was slightly more inflamed. No patient had silicone oil bubble in the vitreous cavity. There were minimal silicone oil micro droplets in the vitreous cavity.

In group B, all the patients were examined with the help of slit lamp biomicroscope on next postoperative day. All of them had attached retina and relatively more silicone oil micro droplets seen on slit lamp examination. Two patients out of twenty five (8%) were found with silicone oil bubble in the vitreous cavity. These patients had to undergo another surgery for removal of remaining silicone oil.

## **Discussion:**

Silicone oil is commonly used as endotamponade for 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.

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. Multiple studies have been conducted all over the world in an attempt to see which technique is the best one.

In our study when 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. At the same time we noticed that after this procedure more silicone oil micro droplets were found in the



vitreal cavity of all the patients of this group. Further more in 8% cases last bubble of silicone oil could not be removed and we had to operate again for this purpose.

The three port technique looks slightly more traumatic for the patients but postoperatively we noticed relatively much less micro droplets of silicone oil. 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. So according to our study three port technique of SOR looks to be a relatively better one as compared with the two port technique.

In 2010 Dr. Aamir Choudhry 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 other two 23G ports were used for passive silicone oil removal. They reported that it is a very safe and cost effective technique<sup>9</sup>.

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<sup>8</sup>.

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<sup>6</sup>.

Jian-Qin Lei 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%<sup>2</sup>.

In another study Gul Arian 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  $576.4 \pm 46.0$  in pseudophakics and  $611.0 \pm 36.2$  microns in aphakic eyes. Postoperatively these readings were  $582.7 \pm 49.5$  and  $614.5 \pm 82.4$  microns at three months after SOR<sup>13</sup>.

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<sup>14</sup>.

Kashif Jahangir 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<sup>15</sup>.

Darakhshanda et al used three port SOR technique and reported 38% retinal re-detachment during one year of follow up<sup>16</sup>.

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<sup>3</sup>.

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<sup>17</sup>.

### Conclusion:

On completion of this study and comparing the results with other national and international studies we reached the conclusion that removal of silicone oil is a very important part of management of retinal detachment cases. Whatever technique is used and whatever prophylactic



measures are adopted the chances of retinal re-detachment are always there. Three port technique is comparatively better as compared with the two port technique because 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 assess 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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