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ORIGINAL ARTICLE

Effect of Facedown vs Non-Facedown Position on Macular Hole Closure after Surgery

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ABSTRACT

Background: Internal Limiting Membrane (ILM) peeling with Gas tamponade after Pars Plana vitrectomy is routinely done in macular hole surgery. After the procedure, a face-down position (FDP) is advised to the patients to promote macular hole closure by pushing the bubble of Gas against the posterior pole. However, elderly patients and those with medical comorbidities may feel uncomfortable in FDP. A few post-operative complications may also be caused by it. So, the aim of this study is to compare and evaluate the role of postoperative non-face-down position (nFDP) and FDP on the macular hole closure rate after PPV with ILM peeling.

Patients and methods: 20 phakic eyes of 20 patients, with idiopathic full-thickness macular holes, underwent vitrectomy, with dye-assisted peeling of the ILM and 14% perfluoro propane gas. Patients were divided randomly into two groups; face down position (FDP, posturing group) or non face down (nFDP, non-posturing group) for 7 days. Main focus was to see anatomical hole closure till 7 days postoperatively.

Results: Macular holes closed in 10 of 10 eyes in the posturing (FDP) group and in 9 out of 10 in the non-posturing group (nFDP) seven days after the surgery. Chi-square test was applied to see the association between macular hole closure of patients with / without face down position. It was observed that macular hole closure was less likely to be associated with posturing (X2= 1.2, p-value= 0.549) while it was likely to be associated with size of macular hole (X2= 15.9, p-value= 0.001). In a sub-group analysis according to the size, all the macular holes smaller than 490 µm closed regardless of posturing. While holes larger than 490 µm were not closed in nFDP position.

Conclusion: Post-operative face-down position has no statistically significant effect on macular hole closure in comparison to non-face down positioning.

Keywords: Macular hole (MH), Face down position (FDP), Posturing, Closure rate, Randomized controlled Trials (RCTs)

INTRODUCTION

ILM peeling and gas tamponade in Pars Plana Vitrectomy is the standard surgical treatment for the management of different types of macular holes (MH)[1,2]. A face-down position (FDP) is advised to the patients to promote macular hole closure by pushing the bubble of gas against the posterior pole involving macular area[2-4]. Sometimes, the FDP is not comfortable particularly for old patients and in patients having medical conditions like Arthritis, osteoporosis, stroke. It may also be associated with other postoperative complications such as angle closure glaucoma and Ulnar nerve palsies[2]. In the meantime, it has been reported that Face down position post MH surgery does not provide functional or anatomical benefit[5]. In the past, several studies had been carried out to evaluate the effect of posturing on MH healing stating that face-down positioning had no extra benefit in macular hole closure[2,6-7] However, the Face-down posturing has not been completely replaced by the non-face-down posturing. Although some ophthalmologists had shortened the duration of Face Down Position (FDP) yet they did not completely abandon this posture. Study conducted by Guillaubey et al. revealed the importance of postoperative face-down positioning in closure of macular holes larger than of 400 µm[8]. This randomized controlled trial (RCT) was conducted to infer whether the FDP is compulsory for recovery of MH surgery or not as it remains unclear up till now whether the FDP or nFDP is more beneficial for macular hole closure after MH surgery.

MATERIAL AND METHODS

It was a comparative interventional, and randomized clinical trial. Twenty eyes of twenty patients, listed for macular hole surgery, were recruited at Services Hospital, Lahore. Study was conducted from July 2019 to February 2020 after getting approval from the Services Hospital Research and Ethical Committee. Patients having full-thickness idiopathic macular holes of stage III and IV, confirmed by optical coherence tomography (OCT) were included in the study. Written informed consent was obtained from each participant. Individuals with history of ocular trauma, any ophthalmological surgery, or patients with visual loss more than one year, suggesting macular hole duration of greater than twelve months, were excluded from the study. Demographic data, best corrected visual acuity (expressed as logMAR unit) and duration of macular hole were recorded pre-operatively. Each participant underwent complete ocular examination including evaluation of anterior segment, fundus examination, measurement of intraocular pressure (IOP) and OCTs of the macula.

Surgical Procedure: Vitreoretinal surgeons and subspeciality fellows under supervision, performed the 23-gauge three-port pars plana vitrectomy surgery including peeling of the inner limiting membrane. 0.15% Trypan-blue (Membrane Blue, DORC, Zuidland, and The Netherlands) was used to stain the ILM under air for 2 min. For any peripheral break, cryo-retinopexy was applied. Complete air-gas exchange or a fluid-air exchange were performed using perfluropropane gas (C3F8 14%).

Randomization: Randomization of the patients, in equal numbers, to FDP or nFDP groups was done by using random permuted blocks, after completion of surgery. Posturing group patients were advised to have a FDP for fifty minutes in an hour, for seven days post-operatively. Patients of Non-posturing group were advised to avoid a face-down position with no other restriction. At the end of 1 week after surgery, follow up check was carried out, visual acuity and any adverse events were documented. Final macular hole status was determined by OCT imaging and biomicroscopy. OCT scans were analyzed and macular holes were graded the in a masked fashion as ‘closed’, ‘open and elevated’ or ‘open and flat’.

Data Analysis: All the data was entered and then analyzed by SPPS Version 23. Data was expressed as Mean±SD. And p-value less than 0.05 was considered significant. Chi square test was applied to see effect of posture on macular hole closure. Student’s

t-test was applied to see the association of macular hole closure with size of macular hole.

RESULTS

A total of 20 subjects participated in this study and were divided randomly to either the group of treatment. All subjects who were enrolled in this experimental trial were successfully fulfilled the schedule examination and hence study was completed, none of them was taken away or stopped the follow-up. The patients were divided into two groups; face down posture (FDP) group and non-face down posture (nFDP) group with no differences in the baseline parameters in both groups. There were 4 males and 6 females were present in face down group while in non-face down group, 7 males and 3 females were present respectively. Mean age in face down group was 60.6± 6.7 years while in non-posturing group it was 60.3±5.7 years. There was no statistical difference between ages of 2 groups with p-value of 0.915. Pre- Operative macular hole size was 482+51.6 µm in FDP group while in non-head down posture group it was 486+ 31 µm with p-value is 0.845 as shown in Table No. 1. At follow up after one week, all patients had hand movements vision and their MH status was assessed by clinical examination or by OCT. After 1 week post-operatively, macular holes were closed in all 10 (100%) eyes in the FDP group and in 9 out of 10 eyes in the nFDP group (90 %) as shown in table-2. The post-op OCT macular hole closure was observed in FDP and nFDP groups showed that equal participants (07) in both groups had macular hole closure on post-op day-1, while 3 in face down and 2 in non-face down had macular hole closure after 7 post-op days. One of them had no closure till after 7 post-op days as shown in figure-1. Here we also observed that13 macular holes of less than 490µm size and 1 macular hole of more than 490 µm size were closed after first post -op day while 5 macular holes of more than 490 size were closed after one week, while one macular hole was not closed initially, this shows that macular hole closure was likely to be associated with size of macular hole (X2= 15.9, p-value= 0.001) as shown in table -2. Student's t test was applied to see the association of macular hole closure with size of macular hole within this study participants, data showed that first post-op day (14 participants) and 7 post-op day (05 participants) groups had significant differences between macular hole size with p-value 0.000 as shown in table-2.

Table 1: Demographic and other parameters in patients

Parameters		Face Down Posture (10)		Non-Facedown Posture (10)		p-value
		Male	Female	Male	Female	
Participants		4	6	7	3	0.17*
Pre-Op OCT Macular Hole Closure	First post op day	7		7		0.54
	7 post op day	3		2		
	No closure at 7 post op day	1		0		
Association of Age and Macular hole Size and Posture						
Mean Age in years		60.6± 6.7		60.3±5.7		0.915†
Macular Hole Size in µm		482+51.6		486+ 31		0.845

*p-value significant at 0.05 by student t test
†p-value significant at 0.05 by chi square test

Table 2: Macular hole closure with size of macular hole in study participants

Variable of Study		Pre- Op Macular Hole size (µm)		X^2	P-Value
		0-490	491-Above		
Macular hole closure at 1st post op and 7 post op day	First post op day	13	1	15.2	0.001†
	7 post op day	0	5		
	No closure at 7 post op day	0	1		
	Association of Macular hole closure with size of macular hole				
	First post op day	14	463.4+26.5	---	0.000*
	7 post op day	05	524.8+10.6		

*p-value significant at 0.05 by student t test
†p-value significant at 0.05 by chi square test

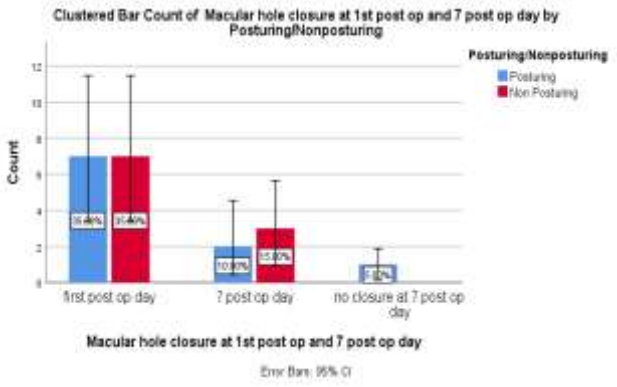

Figure 1: Graph showing Macular hole closure status at day 1 and 7 in posturing and non-posturing groups

DISCUSSION

Till now, there is no firm evidence of extra benefits of FDP after MH surgery. Several studies have reported high rates of anatomical closure with limited or no face-down positioning at all[5-7]. Certain other studies have had contrary results[9-11]. However, Guillaubey et al,[8] published the results of a RCT which showed that face-down positioning for 5 days could be beneficial for macular hole closure specially for larger holes. However, they performed combined phaco-vitrectomy almost in half of the eyes which might have given some advantage in hole closure. This fact has been investigated by another study conducted by Yorston et al[12], and concluded that posturing has no benefit when vitrectomy is combined with cataract surgery. The result of a RCT conducted by Lange CA et al[2], is consistent with those of Guillaubey et al[8] in suggesting that post-operative FDP can improve the likelihood of MH closure. The aim of this study was to determine the value of FDP following vitrectomy, ILM peeling for idiopathic full-thickness macular holes and our results are similar in contrary to the results of previous studies conducted by Guillaubey et al and Lange CA et al,[2] and our results are almost similar to results of RCT conducted by Alberti M, La Cour M, 2016,[13] who concluded that nFDP is noninferior compared with FDP in macular hole surgery. We remain unable to find additional benefits of FDP in MH closure after surgery.

CONCLUSION

In conclusion, we can say that there is no difference in macular hole closure outcome in postoperative face down and non-face down posturing positions. While small sized macular holes (smaller than 490 µm) are more likely to be closed earlier and without any

complication as compared to large size holes. The results may be helpful for old age patients to lessen the posture maintenance difficulties and avoidance of systemic complications. To validate these findings in future, further RCTs with large sample sizes are warranted.

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