

# Vitreotomy Combined with Scleral Buckling in Patients with Inferior Retinal Breaks

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**Purpose:** To study the anatomical results and complications of vitrectomy with internal tamponade, combined with scleral buckling in patients having retinal detachment due to inferior break(s)

**Material and Methods:** This descriptive case series study was conducted on 34 patients having retinal detachment due to inferior break(s). 22 patients were male and 12 patients were female. All patients underwent vitrectomy with silicone oil combined with buckling. Patients were followed for six months and status of retina noted, along with any post-operative complications.

**Results:** Successful attachment of the retina was achieved in 32 (94.12%) patients. Four patients (11.76%) had post-operative glaucoma, 3 (8.82%) had transient diplopia, while 3 out of the 13 phakic patients (23.08) developed cataract within six months of the surgery.

**Conclusion:** Vitrectomy combined with scleral buckling is a safe and effective procedure to treat retinal detachment in patients having inferior retinal breaks.

Retinal detachment is the separation of neurosensory retina from the retinal pigment epithelium. Rhegmatogenous retinal detachment involves a full thickness retinal break and accumulation of liquefied vitreous under the neurosensory retina, separating it from the retinal pigment epithelium<sup>1</sup>.

Various procedures are employed to treat rhegmatogenous retinal detachment. All of them involve closing the break(s) by chorioretinal adhesion, either by internal or external tamponade. The choice of procedure is governed by many factors, primarily the location of the break, the amount of proliferative vitreoretinopathy (PVR) and the availability of instrumentation and expertise.

Eyes with minimal PVR and anteriorly located break(s) can be successfully managed by pneumatic retinopexy, scleral buckle or vitrectomy while eyes with posterior break(s) or significant PVR need vitrectomy along with tamponading gas or oil<sup>2</sup>. The specific gravities of most of the internal tamponading agents are less than balanced saline solution. That is why oil or gas bubble floats at the top most position,

pressing the retina and providing a tamponade for superior retina. However, its effect on the inferior retina is not enough to press the retina down to pigment epithelium layer and it fails to provide a tamponade<sup>3</sup>. This poses a problem in managing patients having high grade PVR and inferior breaks, since neither scleral buckle nor vitrectomy alone can keep the retina attached.

Various studies have been conducted on which procedure should be carried out for such cases, with no general consensus. Some authors suggest carrying out vitrectomy with internal tamponade alone<sup>4</sup>, followed by strict head posture, while others have suggested scleral buckle and vitrectomy with internal tamponade combined<sup>5</sup>. The protocol for such cases in our department is to carry out scleral buckle plus vitrectomy combined with internal tamponade, and we would like to share our experience of the results and complications of this procedure.

## MATERIAL AND METHODS

The study was conducted in eye department of Lahore General Hospital, Lahore. Patients were operated

between January 2012 to June 2013, while post-operative examination continued till December 2013. Thirty four patients having primary rhegmatogenous retinal detachment, with inferior breaks between 4 o'clock to 8 o'clock positions were included in the study. All the patients were informed about their inclusion in the study and a written consent was obtained. The study was approved from the ethical committee of the hospital.

A detailed pre-operative examination was carried out in all patients, with their visual acuity, pupil reaction, intraocular pressure, slit lamp examination of anterior segment, slit lamp and indirect ophthalmoscopy of posterior segment, status of the retina, grading of proliferative vitreoretinopathy (PVR), extent of detachment and location of breaks noted.

The exclusion criteria were: 1) patients with a past history of surgery for retinal detachment. 2) Patients with detachment due to retinal dialysis. 3) Patients with grade A PVR.

All surgeries were performed by two experienced vitreo-retinal consultants. 360° scleral encirclement was performed using a silicone band – 240, anchored at 12-14mm from the limbus. It was supplemented with an appropriate segmental buckle (silicone tyre-277) to cover the retinal break(s). A 23-G, 3-port pars plana vitrectomy was performed on each patient using Accurus vitrectomy system. Silicone oil, 1000 centistokes (26 patients) or 5000 centistokes (8 patients), was used for internal tamponading. Laser barrage around the break(s) was applied in all patients. Post-operative examination was carried out on 1<sup>st</sup> and 7<sup>th</sup> post operative days; and then after 1, 3 and 6 months and status of retina noted on each visit.

**Statistical analysis** was done by using SPSS version 20. Descriptive statistics was used to analyse the data. A quantitative variable like age was measured by mean and standard deviation. Frequency and percentage was calculated for gender and surgical outcome in terms of retinal attachment or non-attachment.

## RESULTS

Thirty four patients fulfilling the inclusion and exclusion criteria were identified from January 2012 to June 2013. 22 (64.7%) patients were male, while 12 (35.2%) were female (Fig. 1). The statistical analysis of gender is shown in table 1. The mean age of the patients was 32.88 with standard deviation of 13.42 (Table 2). In 17 patients, the break was located

inferotemporally, in 3 patients, it was located inferomedially, in 6 patients, it was located inferiorly at 6 o'clock, while 5 patients had multiple breaks inferiorly. No definite break could be identified in 3 patients due to poor peripheral visibility. However, their inferior retinas showed diffuse degeneration and atrophic areas. The configuration of the detached retina also corresponded to the presence of an inferior retinal pathology (Lincoff rule), so they were supported with an inferior tyre and included in the study (Table 3). Fourteen patients had grade B PVR, while twenty patients had grade C PVR. Four patients had myopia of greater than -6 diopters while lattice degeneration was noted in 4 patients. 9 patients had pseudophakia while 11 were aphakic and one patient presented with dropped IOL. There was a history of trauma in 4 patients (Fig. 2).

**Table 1:** Statistical analysis of gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	12	35.3	35.3	35.3
Valid Male	22	64.7	64.7	100.0
Total	34	100.0	100.0	

**Table 2:** Age of the patients

	Minimum	Maximum	Mean	SD
Age (years)	9	60	32.89	13.42

**Table 3:** Location of Breaks

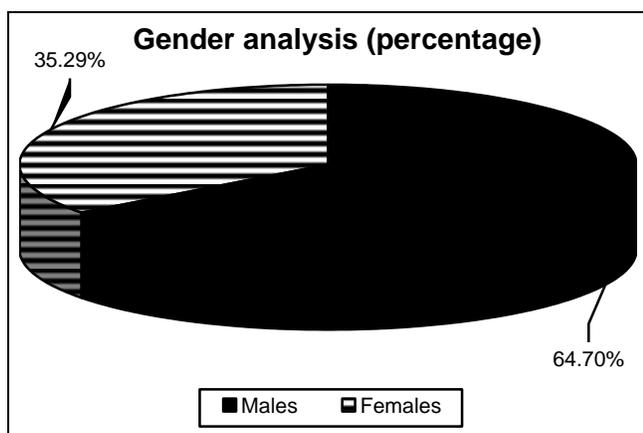
Location	No. of Patients
Inferotemporal	17
Inferonasal	3
Inferior (6 o'Clock)	6
Multiple inferior breaks	5
No identified	3

Successful attachment of the retina was achieved in 32 (94.12%) patients, while 2 had persistent detachment (Fig. 3). Out of the patients with grade B PVR (14), one developed grade C PVR but his retina

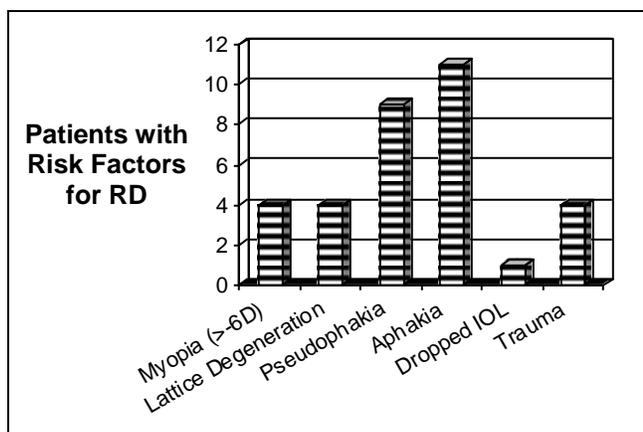
remained attached. The statistical representation of surgical outcome in terms of retinal reattachment is shown in Table 4.

**Table 4:** Statistical analysis retinal reattachment

	Frequency	Percent	Valid Percent	Cumulative Percent
No	2	5.9	5.9	5.9
Valid Yes	32	94.1	94.1	100.0
Total	34	100.0	100.0	



**Fig. 1:** Gender analysis



**Fig. 2:** Number of patients with risk factors for Retinal Detachment

The findings were further analyzed by the T-Test and the paired samples statistics, correlations and samples test are shown in tables 5, 6 and 7 respectively.

Four patients (11.76%) had post-operative glaucoma while 3 patients (8.82%) complained of diplopia which resolved spontaneously. Three out of the 13 phakic patients (23.08%) developed cataract within 6 months of the surgery (Fig. 4).

Out of the two patients with persistent retinal detachment following first surgery, one patient had successful reattachment following a second surgery, while the retina of one patient remained detached even after a second surgery.

**Table 5:** Paired samples statistics

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Attached retina	34	.239	.041
	Detached retina	34	.239	.041

**Table 6:** Paired samples Correlations

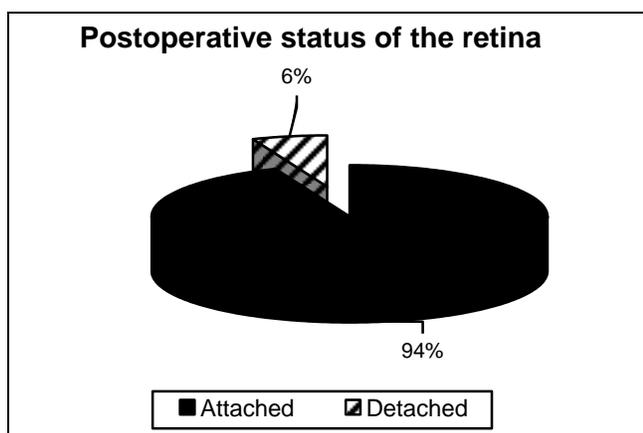
	N	Correlation	Sig.
Pair 1 Attached retina and Detached retina	34	-1.000	.000

**DISCUSSION**

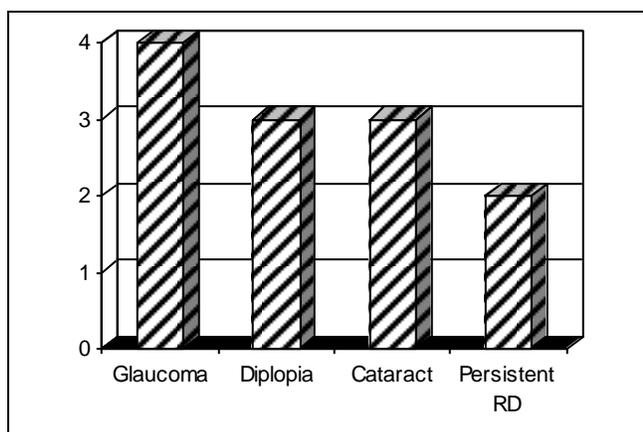
Current surgical techniques can obtain high rates of anatomical and visual success in patients with retinal detachment<sup>6</sup>. However, the management of retinal detachment with inferior break(s) has been the focus of debate recently. The nature of the internal tamponading agents, due to low specific gravity than normal saline, does not serve to tamponade the inferior retina against the choroid. Some authorities advocate pars plana vitrectomy with internal tamponade alone, along with strict post operative posturing in cases of inferior retinal breaks in which buckling alone is not sufficient (e.g. high grade PVR). They argue that combining scleral buckling does not add any additional advantage over vitrectomy alone and poses the patient to additional risks of scleral buckling like diplopia<sup>7</sup>, explant extrusion, infection<sup>8</sup> and choroidal haemorrhage. One such argument has been given by Wickham and associates<sup>4</sup>. They state

**Table 7:** Paired samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Attached retina - detached retina	-.882	.478	.082	-1.049	-.716	-10.771	33	.000



**Fig. 3:** Postoperative results



**Fig. 4:** Postoperative complications

that the success rate of the group of patients who underwent vitrectomy combined with scleral buckle (73%) was lower than the group of patients undergoing vitrectomy with internal tamponade alone (89%). The most common cause of treatment failure in vitrectomy combined with scleral buckle was noted to be PVR (20%, as opposed to 5% in vitrectomy alone group). One reason of such a high rate of PVR in vitrectomy combined with scleral buckling group in

this study can be the retrospective nature of the study and the lack of randomization. Amount of preoperative PVR is a risk factor for severe postoperative PVR<sup>9</sup>. It is possible that relatively complicated cases with higher pre-operative PVR were treated with vitrectomy combined with scleral buckling, leading to high post operative PVR in this group. Wickham and associates also state that the primary break and drainage sites were treated either with cryotherapy or endolaser. Incidence of PVR after cryotherapy (25.8%) is much more than that of endolaser (2.2%)<sup>10</sup>. It hasn't been mentioned what percentage of patients in each group received cryotherapy, and that can be one of the reasons for such a high percentage of PVR in vitrectomy combined with scleral buckling group. In our study, there were fourteen patients with grade B PVR preoperatively, out of which only one patient (10%) had developed grade C PVR after six months of follow up. The anatomical success rate of vitrectomy combined with scleral buckling was also higher (94%) in our study. A study by Alexander P et al<sup>5</sup> has shown 95% success rate with a combined procedure, without any sight-threatening complications. Mehmet Demir et al<sup>11</sup> found a similar anatomical success rate in patients treated with either vitrectomy alone (96.0%) or vitrectomy combined with scleral buckling (95.8%). Similar comparable results in two groups were reported in a retrospective comparative case series<sup>12</sup>, being 98.9% for vitrectomy alone and 98.8% for combined procedure. Another study reported that the difference in the rate of secondary surgical procedure was similar in the two groups<sup>13</sup>. In a retrospective study of thirty pseudophakic or aphakic eyes who underwent a primary combined procedure, Qin B et al<sup>14</sup> found that all retina were anatomically reattached after the first operation. In their retrospective series of 512 patients who underwent primary vitrectomy for retinal detachment, Heimann et al<sup>15</sup> found a significantly higher rate of re-detachment in patients

with inferior detachment. They attribute this to their use of relatively short-acting tamponades which are probably not sufficient to support the inferior retina. Sharma et al<sup>16</sup> did not find any significant difference in outcome in two groups of patients treated with vitrectomy and gas alone, either with or without inferior break detachments.

We did not find any significant sight – threatening complications of scleral buckling in our study. Similar conclusions have been drawn in other studies too, in which vitrectomy combined with scleral buckling was done<sup>4,5</sup>. However, some studies, in which scleral buckling was done alone, report potentially sight-threatening complications of scleral buckling<sup>17,18</sup>.

## CONCLUSION

Our study shows that supplementary scleral buckling has its role in cases with inferior retinal breaks, as it provides an external tamponade to inferior breaks, which would otherwise not be covered by internal tamponading agents like silicone oil or SF<sub>6</sub> gas etc. It is an effective and safe procedure that improves the primary success rate in such cases

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