

Original Article

SURGICAL OUTCOME OF SCLERAL BUCKLING VERSUS PARS PLANA VITRECTOMY IN PRIMARY PSEUDOPHAKIC RHEGMATOGENOUS RETINAL DETACHMENT

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Objective: To evaluate anatomical and visual outcome of scleral buckling surgery versus pars plana vitrectomy in pseudophakic patients with rhegmatogenous retinal detachment.

Material and Methods: Sixty patients having rhegmatogenous retinal detachment, fulfilling inclusion and exclusion criteria were recruited for study. The patients were divided randomly in two groups of thirty patients each. In group (A) 30 patients underwent conventional scleral buckling and in group (B), 30 patients with retinal detachment had pars plana vitrectomy done. Almost all patients were having macula off, with history of decreased visual acuity ranging between one week to eight weeks. The patients with grade C proliferative vitreo-retinopathy (PVR), previous scleral buckling / vitrectomy, posterior vitreous detachment and pseudophakic with posterior capsular rupture were also excluded. After detailed preoperative assessment and surgical plan, standard scleral buckling procedure including encircling and local explants with cryo-therapy, was used to repair all primary rhegmatogenous detachments in group A. Sub-retinal fluid (SRF) drainage was performed, as needed. In group B, 20G pars plana vitrectomy was performed in all pseudophakic retinal detachments. All the per-operative and postoperative complications were recorded. The outcome measures of study were visual outcome and anatomical status of retina, after retinal re-attachment surgery. The patients were followed at least six months after surgery regarding, visual acuity, intra-ocular pressure, retinal re-attachment.

Results: Thirty eyes in group A were treated by scleral buckling and cryotherapy, while 30 eyes in group B were managed by primary pars plana vitrectomy. All retinal detachments were macula off, with grade A or B, PVR. Anatomical success rate in Scleral buckling group was 86.66 % and 13.33 % patients had re-detachment, so pars plana vitrectomy was performed. One patient was managed with intra-vitreous SF6 gas injection and 360 degree laser barrage. Anatomical success rate in pars plana vitrectomy group was 90 %, while 10 % patients were managed by second surgery. No significant complication was noted in both types of surgeries.

Conclusion: Pseudophakic rhegmatogenous retinal detachments, can be managed effectively by pars plana vitrectomy and scleral buckling, with comparable visual and anatomical outcome.

Key words: Scleral buckle, pars plana vitrectomy, pseudophakic, rhegmatogenous retinal detachment.

Introduction

Rhegmatogenous retinal detachment (RRD) can be managed by different methods, like pneumatic retinopexy, scleral buckling and pars plana vitrectomy. The decision of appropriate surgical procedure depends on many factors and also status of fellow eye. The following factors are always considered in planning a retinal re-attachment surgery like size of break, site of break, extent of detachment, retinal degenerations, associated posterior vitreous detachment and status of proliferative vitreo-retinopathy (PVR).^{1,2}

Currently, there is tendency of primary pars plana vitrectomy, in most cases of rhegmatogenous retinal detachment, especially in pseudophakic patients and

scleral buckling is favored for phakic patients. But still scleral buckle can also be used for management of pseudophakic retinal detachment. The principle of management of rhegmatogenous retinal detachment, is to identify break, seal the break, provide a tamponade either external or internal, and drainage of sub-retinal fluid either internal or external if needed. It is considered, if there is no posterior vitreous detachment, retinal re-attachment surgery can have better outcome with scleral buckling surgery. But it is an established fact that 85 % patients with rhegmatogenous retinal detachment have associated posterior vitreous detachment.^{3,4}

Pneumatic retinopexy with sulfur hexafluoride (SF6) gas tamponade is favored by some retina surgeons for

primary rhegmatogenous retinal detachment in one or two superior quadrants as outpatient procedure with good results in selected cases. Hilton and Grizzard in 1986, reported pneumatic retinopexy with successful treatment of retinal detachment case series. The main advantage of this procedure is that it can be done as an outpatient setting with even topical anesthesia. In a multicenter randomized clinical trial, a primary anatomical success rate was attained in 75% of phakic eyes and 67% in pseudophakic eyes.⁵ But pneumatic retinopexy has limitation of selected cases. Scleral buckling is considered a viable option for treatment of rhegmatogenous retinal detachment in phakic eyes because it seal the retinal break, provide tamponade with less risk of cataract formation and progression, leading to better long term anatomical and visual outcome. But some retina surgeons consider scleral buckling is not so effective for pseudophakic retinal detachment because of posterior vitreous detachment (PVD), cases with posterior capsular rupture with vitreous loss, more proliferative vitreoretinopathy (PVR). There are rapid advancements in instrumentation and techniques for vitrectomy with good anatomical and functional results. So there is growing trend of primary pars plana vitrectomy for almost all cases of rhegmatogenous retinal detachment. Many surgeons prefer to perform phacoemulsification with pars plana vitrectomy in retinal detachment patients older than 50 years, while some surgeons categorically perform vitrectomy for primary pseudophakic retinal detachment. But the retina project-report 2, showed that pars plana vitrectomy was mostly performed in pseudophakic eyes and resulted in a worse functional outcome as compared to scleral buckle⁶

Now a days, millions of cataract surgeries being performed with implantation of intraocular lens leading to pseudophakic status of eye. Our current techniques like phacoemulsification and femtosecond laser assisted cataract surgery, are very safe and effective in cataract management. If posterior capsular rupture occur in cataract surgery, it increases risk of rhegmatogenous retinal detachment by 11%. But still after uneventful cataract surgery there is 7 % incidence of rhegmatogenous retinal detachment. There can be associated risk factors like lattice degenerations, peripheral retinal degenerations, high myopia, posterior vitreous detachment, which can increase risk of retinal detachment in uneventful cataract surgery.⁸

Rhegmatogenous retinal detachment in phakic and

pseudophakic eyes can have difference in vitreous dynamics, especially when posterior capsule is ruptured. The characteristics of retinal breaks differ in pseudophakic and phakic retinal detachments. Usually, retinal breaks are smaller and there are round holes in pseudophakic retinal detachments. It was considered, during pars plana vitrectomy, internal search of small breaks and round holes is better possible, so pseudophakic retinal detachments can be better managed with pars plana vitrectomy and risk of retinal re-detachment can be reduced. Some surgeons manage small anterior breaks with 360 encircling band, which secure even missed breaks. So encircling can be helpful to seal and secure breaks in pseudophakic retinal detachments, which favors use of scleral buckling surgery for management of pseudophakic retinal detachment.⁹

Our study was performed to evaluate how much effective scleral buckling surgery is, as compared to pars plana vitrectomy in management of primary pseudophakic rhegmatogenous retinal detachments.

Material and Methods

All the cases were recruited through retina clinic of Eye unit III, Mayo Hospital/ King Edward Medical University Lahore. Informed consent was taken to include in study. It was a prospective, comparative and consecutive cohort study conducted from 01, July 2013 to 30, September 2014. The study included sixty patients of primary pseudophakic rhegmatogenous retinal detachment. Detailed history and clinical examination was performed, with drawing of breaks and configuration of retinal detachment. Lens status of patients were categorically noted either phakic or pseudophakic. Aphakic and phakic patients were excluded. Systemic status of patients was evaluated for fitness of surgical procedure under local anesthesia.

Both male and female patients with rhegmatogenous retinal detachment were included. B Scan Ultrasonography was performed if needed. Control of diabetes mellitus was given priority. The patients having retinal detachment due to penetrating trauma, previous retinal surgery, choroidal detachment, significant cataract obscuring view of retina, proliferative vitreoretinopathy (PVR) grade C, retinovascular disorders like proliferative diabetic retinopathy (PDR), retinal vein occlusion (RVO) were excluded. The patients with combined tractional and rhegmatogenous retinal detachment were not included. Systemic diseases like diabetes mellitus and hypertension were managed.

The surgical procedures were performed by three

experienced surgeons randomly, under local anesthesia. Standard scleral buckling with cryotherapy was performed in 30 cases under microscope with help of indirect Ophthalmoscope. The procedure started with 360 degree peritomy, followed by separation of four rectus muscles. The recti were tied with silk 1/0 suture. Indirect ophthalmoscopy was performed to localize retinal break and marked on sclera with suture. Cryotherapy was done to seal the retinal break/ breaks. 360 encircling Silicon band 2.5 mm was passed under rectus muscles and anchored to sclera with 5/0 ethibond in all four quadrants and two ends of band secured by silicon sleeve in supero-temporal quadrants. Silicon tier or sponge was applied to provide indentation and external tamponade to cover breaks for retinal re-attachment. Sub retinal fluid (SRF) drainage was performed if needed like in bullous retinal detachments, old and inferior retinal detachments. Per-operative complications were noted and managed accordingly.

In group B, 20 gauge pars plana vitrectomy was performed in all cases. Internal drainage was performed and endolaser photocoagulation was applied around breaks. Fluid air oil exchange was done. Silicon oil tamponade was used in almost all cases. No significant per-operative complication encountered. All the patients were followed for six months at least, for outcome measure of this study, which were anatomical re-attachment of retina and functional outcome like best corrected visual acuity (BCVA). All the information was recorded in proforma.

Results

Sixty patients were analyzed with minimum six months of follow up in this study. In group A, the mean age was 56.7 years (range 20-65 years) and in group B, the average age was 61 years (range 20-70 years). The p value is >0.05, statistically no difference between two groups. (Table 1)

In group A there were 18 male and 12 female patients. In group B, 14 males and 16 females were included in the study (Table 2). In Group A, all patients were treated with Standard Scleral buckling surgery with cryotherapy. Per-operative and post-operative complications were noted and managed. Pars plana vitrectomy was performed in group B, patients with pseudophakic retinal detachment.

Anatomical outcome after scleral buckling in group A was comparable to pars plana vitrectomy in group B. There was attached retina after six months follow

up in 86.66 % patients in Scleral buckle group and 90 % in pars plana vitrectomy group. (Table 3)

Best corrected visual acuity was categorized in three types, > 6/12, 6/18 to 6/60 and <6/60. In Scleral buckling group, after six months 46.66 % patients, while in pars plana vitrectomy group 43.33 % patient, had better or equal to 6/12 visual acuity. (Table 4)

Retinal re-detachment was found in 13.33 % patients in scleral buckle group and 10 % patients in pseudophakic group, which were managed by pars plana vitrectomy and one patient in scleral buckle group was managed with SF 6 gas internal tamponade, followed by argon laser barrage.

Raised intraocular pressure was found in a few patients, which was effectively managed with systemic acetazolamide and topical beta blockers.

Table-1: Age distribution of patients of both groups.

Age (Years)	Group A	Group B
40-50	08	07
51-60	07	11
61-70	11	07
71-80	04	05
Total	30	30

p >0.05 (Not significant)

Table-2: Sex distribution of patients in both groups.

Sex	Group A	Group B	Total
Male	18	14	32 (53.33%)
Female	12	16	28 (46.66%)
Total	30	30	60 (100%)

p <0.05 (significant)

Table-3: Anatomical outcome.

	Group A (SB group)	Group B (PPV Group)
Retinal attachment	26 (86.66%)	27 (90%)
Retinal Detachment	04 (13.33%)	27 (10%)
Secondary PPV performed	03 (10%)	03 (10%)

p <0.05 (significant)

Table-4: Best Corrected Visual Acuity (BCVA).

BCVA	Group A (SB group)	Group B (PPV Group)
>6/12	14 (46.6%)	13 (43.33%)
6/18-6/60	09 (30%)	10 (33.33%)
<6/60	07 (23.33%)	07 (23.33%)
Total	30 (100%)	30 (100%)

p <0.05 (significant)

Discussion

Scleral buckling and pars plana vitrectomy are two main surgical techniques for management of rhegmatogenous retinal detachment. The choice of procedure is very important for successful surgical outcome and optimal visual recovery. The best strategy to surgery is to begin with simplest method of repair and to proceed more invasive surgery as needed, depending upon status of the pathology. Coexisting medical and ocular problems should be dealt to increase surgical outcome. One must consider factors affecting both anatomical and functional outcome of surgical procedure.¹⁰

There are a few risk factor for retinal re-detachment after surgery like missed breaks, proliferative vitreoretinopathy. The main risk of retinal detachment in either phakic or pseudophakic eyes is proliferative vitreoretinopathy (PVR). Research proved that PVR was found 5.3% to 11.5 % in patients after pars plana vitrectomy for rhegmatogenous retinal detachment and increased probability of retinal re-attachment surgery from 13.2 % to 24.5 %. While after Scleral buckling surgery 1.9 % cases developed PVR and 7.3 % patients needed retinal re-attachment surgery.^{11,12}

Research in last 20 years, proved that anatomical outcome and optimal visual recovery in retinal detachments with macula off has improved significantly. Now a days, we can have 90% or greater successful surgical outcome and a final reattachment rate of over 95% with retinal re-attachment surgery. Attainment of central vision better than 20/50 in macula off retinal detachments increased from 42% to between 60% and 80% of patients.¹³

Pars plana vitrectomy is becoming now a days a procedure of choice in variety of vitreoretinal disorders. Modern vitrectomy equipment and techniques are developing rapidly and effectively providing excellent surgical outcome in many vitreoretinal problems, which we were unable to manage in past. Currently, there is growing tendency to manage pseudophakic retinal detachment with pars plana vitrectomy. But still some surgeons think that Scleral buckling can be an effective treatment modality for pseudophakic retinal detachment.^{14,15}

Scleral Buckling is an extra-ocular procedure as compared to pars plana vitrectomy, with less risk of complications and long term successful outcome. Although research shows there are possible complications associated with scleral buckling, which can be scleral perforation, undesired sub retinal fluid (SRF) drainage, choroidal hemorrhage, choroidal detachment, sub-retinal hemorrhage,

retinal incarceration after SRF drainage, ocular motility disorders with diplopia, anterior segment ischemia and explant exposure. But in good surgical hands, incidence of these possible risks and complications is very low. Studies comparing scleral buckling and pars plana vitrectomy revealed that in phakic patients with rhegmatogenous retinal detachment, there was no risk of cataract formation with scleral buckling, but when pars plana vitrectomy was done, patients had cataract formation. Anatomical success rate was found very similar in both techniques.¹⁶

Bernhard et al performed segmental scleral buckle in 52 eyes with primary rhegmatogenous retinal detachment, having dialysis. After one year follow up, retina was attached in 87% patients. Azad et al, conducted a randomized comparison of scleral buckling and pars plana vitrectomy in 61 phakic eyes. After six months follow up, results showed, there was attached retina in 80.6% cases in scleral buckle group and 80 % patients in vitrectomy group. It was found that anatomical success rate was similar in this study but visual outcome was compromised in pars plana vitrectomy cases due to cataract formation.^{17,18}

Oshima et al studied 63 eyes in which pars plana vitrectomy was performed. Anatomical success rate after first surgery was 92.1 % but significant complication was cataract formation in 53.8% phakic eyes, which compromised optimal visual recovery. Tewari et al found greater complications of pars plana vitrectomy as compared to scleral buckling in pseudophakic patients and suggested scleral buckling in pseudophakic retinal detachment.^{19,20,21}

Our study proved that anatomical outcome after scleral buckling and pars plana vitrectomy, is comparable. Best corrected visual acuity was found almost similar, six months postoperatively. Only 13.33 % patients with scleral buckling had re-detachment, after six months follow up, and 10% needed secondary pars plana vitrectomy. So despite growing popularity of pars plana vitrectomy, still scleral buckling surgery is effective and safe modality for primary treatment of pseudophakic rhegmatogenous retinal detachment. Scleral buckling surgery provided good anatomical outcome with optimal visual rehabilitation.²²

Conclusion

Primary pseudophakic rhegmatogenous retinal detachment, can be managed effectively by scleral buckling and pars plana vitrectomy, with comparable results.

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