

Should Scleral Buckling Surgery be Applied only on Young and Phakic Patients?

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ABSTRACT

Purpose: To compare the anatomical and functional results of scleral buckling (SB) and pars plana vitrectomy (PPV) in rhegmatogenous retinal detachment (RRD) patients.

Materials and Methods: The records of uncomplicated RRD patients were evaluated retrospectively. The patients were divided into two groups according to the type of surgery (SB or PPV). The demographic features of patients, the status of lens and macula, the duration between diagnosis and surgery, the best-corrected visual acuity (BCVA), intraocular pressure (IOP) and anterior-posterior segment examination were recorded before surgery, at 1st month, 3rd month and final visits. The obtained data were compared between groups.

Results: The study was included 14 patients who underwent SB (Group 1) and 33 patients who underwent PPV. The mean age was 60.1±13.9 (16-87) years. Any difference between the two groups in terms of age, gender, lens status, and macular involvement was detected ($p>0.05$). The duration from diagnosis to surgery was 27.2±6.0 hours in Group 1, and 90.1±30.7 hours in Group 2 ($p<0.0001$). Age ($p:0.199$), the status of the lens ($p:0.234$) and macula ($p:0.144$) were not determinant factors in the choice of surgical method. There was no significant difference between groups in terms of anatomical and visual gain.

Discussion: Although scleral buckling (SB) surgery has been recently a less preferred procedure in the treatment of RRD, it has similar success rates with PPV in uncomplicated RRD. It can be successfully performed not only in young and phakic patients, but also in all RRD patients, provided that appropriate indication.

Keywords: Pars plana vitrectomy, Rhegmatogenous retinal detachment, Retina, Scleral buckling.

INTRODUCTION

Retinal detachment is a disorder that develops when neurosensory retina is pulled away from retinal pigment epithelium and fluid accumulation in the space.¹ It may occur in three forms including rhegmatogenous, tractional or exudative detachment. The rhegmatogenous retinal detachment (RRD) is the most common type of detachment. Vitreous liquefaction, vitreous traction sufficient for formation of tear over retina, and retinal tear and vitreal fluid passage under retina via retinal tear are required for RRD formation. Retinal tear does not lead retinal detachment if liquefied vitreous and vitreoretinal traction are lacking.²

Retinal detachment can be treated by surgery. Initially, a hundred years ago, Gonin et al., discovered that primary pathology is retinal tear in retinal detachment and it can

be treated by repairing retinal tears.³ Despite the advances in vitreoretinal surgery, the primary goal is same in the treatment. In surgery, aim is to remove vitreal traction on retina and to achieve attachment between retina and pigment epithelium by surrounding tear. For this purpose, many surgical methods including pneumatic retinopexy, scleral buckling (SB) surgery and pars plana vitrectomy (PPV). The SB surgery was first described by Custodis and Schepens and remained as gold standard in RRD treatment over 40 years.^{4,5} PPV, first described in 1971, has currently become gold standard owing to technological advances after 2000s. In selected patients, there is an ongoing debate whether these techniques have superiority to each other in RRDs with no proliferative vitreoretinopathy (PVR), giant tear or those not due to necrotic disorders such as acute retinal necrosis. The SB surgery is considered as a method to be used in young phakic patients without cataract or

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macular involvement.^{6,7} Is it accurate to limit SB to above-mentioned group of patients? We believe that SB surgery is a surgical method that can be used not only in a limited group of patients but also in all RRD patients without contraindication and is not inferior than PPV regarding success when preferred in selected cases.

Thus, it was aimed to compare SB surgery with PPV in patients with uncomplicated RRD regardless of age.

MATERIAL AND METHOD

The study enrolled 58 eyes of 60 patients who underwent surgery with diagnosis of RRD at ***** Ophthalmology Clinic between May 2019 and November 2020. The study was approved by local Ethics Committee. The inclusion criteria were follow-up ≥ 6 months, lack of giant tear, non-necrotic, absence of intravitreal hemorrhage and PVR $\leq B$. After excluding patients with follow-up < 6 months, final study population included 47 eyes of 47 patients. In all patients, a comprehensive ophthalmological examination including best-corrected visual acuity (BCVA), slit-lamp biomicroscopy, intraocular pressure (IOP) measurement by Goldmann applanation tonometry and fundus examination using panfundoscopic lens was performed at baseline, at 1st month and 3rd month after surgery and at final control visit. The localization, type, number and size of retinal detachment, extension of detached area and macular involvement (+/-) and PVR degree were determined. PVR was rated based on Retina Society Terminology Committee 1983 Classification.⁸ All surgeries were performed by a single vitreoretinal surgeon (E.K). SB surgery, PPV or SB surgery plus PPV was performed based on surgeon's preference. In all patients who underwent SB surgery, drainage puncture was performed by applying 360° Silicone Band (No.41, 2 mm) and 0.4 cc SF₆ (%100) was given intravitreally. Chandelier illumination was used for retina. In PPV, 23 G instrument and chandelier illumination were used in all patients; retinopexy was performed after achievement of retinal attachment and SF₆ (20%) or C₃F₈ (20%) gases were used. The age was not considered as a criteria in the selection of surgical method. Although phakia or pseudophakia was also not considered as a criteria, PPV was preferred in patients with dense cataract or those with pathologies that may hamper retina visualization due to IOL or in patients with severe vitreous haemorrhage if PVR stage was $\geq B$. Macular involvement was not also taken into consideration in the selection of surgery. Anatomic success was defined as completely attached retina in final control visit while functional success was defined as improvement in visual acuity in final control visit when compared to baseline.

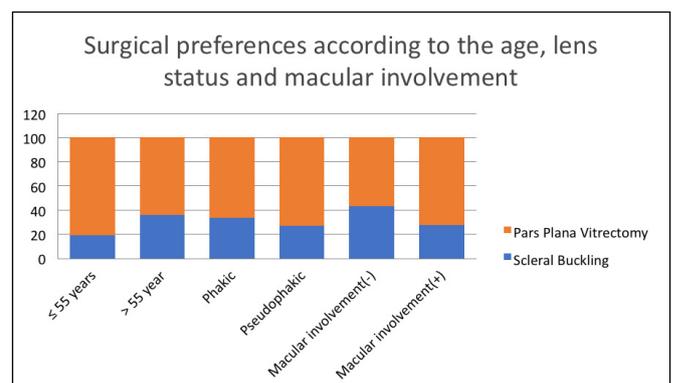
Statistical analysis

Data were analyzed using SPSS version 23.0. Chi-square test was used to evaluate age and gender distribution in study group. Independent samples t test was used to analyze quantitative variables across groups. A p value < 0.05 was considered as statistically significant.

RESULTS

Mean age was 60.1 ± 13.9 years (16-87) in the study population. The study population included 27 men and 20 women. SB surgery was performed in 14 patients (29.8%) whereas PPV surgery in 33 patients (70.2%). SB surgery was added to 12 of 33 patients who underwent PPV. There was no significant difference in age, gender, lens status and macular involvement among groups ($p > 0.05$). The time from diagnosis to surgery was significantly shorter in SB surgery ($p < 0.0001$) (Table 1). Age was not a factor in the selection of surgery type. Of 31 patients aged > 50 years, SB surgery was preferred in 11 (35.5%) whereas PPV was preferred in 20 (64.5%). Of 16 patients aged ≤ 55 years, SB surgery was preferred in 3 (18.8%) whereas PPV was preferred in 13 (81.3%) ($p = 0.199$). Again, lens status was not a factor in the selection of surgery type. Of 21 phakic patients, SB surgery was performed in 7 (33.3%) whereas PPV in 14 (66.7%). Of 26 pseudophakic patients, SB surgery was preferred in 7 (26.9%) whereas PPV in 19 (73.1%) ($p = 0.234$). Macular status was also not a factor in the selection of surgery type. Of 7 patients without macular involvement, SB surgery was preferred in 3 (42.9%) whereas PPV in 4 (57.1%). Of 40 patients with macular involvement, SB surgery was preferred in 11 (27.5%) whereas PPV in 29 (72.5%) ($p = 0.144$) (Graph. 1).

There was no significant difference in anatomic success between groups. Anatomic success was achieved in 12 (85.7%) of 14 patients who underwent SB surgery and in 29 (87.9%) of 33 patients by a single surgery ($p = 0.587$).



Graphic 1: Surgical preferences according to age, lens status and macular involvement in patients with rhegmatogenous retinal detachment.

Table 1: Preoperative characteristics of patients who underwent surgery for retinal detachment.

	Group 1 (n=14)	Group 2 (n=33)	p value
Age (years) ±SD	64.6±9.1	58.1±15.2	0.162
Gender			
➤ Male (%)	6 (42.9)	21 (63.6)	0.160
➤ Female (%)	8 (57.1)	12 (36.3)	
Lens status			
➤ Phakic (%)	7 (50)	14 (42.4)	0.436
➤ Pseudophakic (%)	7 (50)	19 (57.5)	
Maküla tutulumu			
➤ Yes (%)	11 (78.6)	29 (87.9)	0.342
Duration between diagnosis and surgery (hours) ±SD	27.3±6.0	90.1±30.7	p<0,0001*

*statistically significant ratio, SD: Standard deviation

No significant difference was found in functional success between groups. On month 6, BCVA improvement was detected in 11 (78.6%) while BVCA remained stable in 2 patients (14.3%) and worsened in one patient (7.1%) in SB surgery group (n=14). In PPV group (n=33), BCVA improvement was detected in 26 while BVCA remained stable in 4 patients and worsened in 3 of patients (p=0.931).

DISCUSSION

In this study which was studied on primary and uncomplicated RRD, we found that conventional detachment surgery was performed in approximately one-third of the patients in our clinic and anatomic and functional success was not inferior by single surgery when compared to PPV. In recent studies, it is seen that SB surgery is far less preferred surgical method when compared to PPV. In particular, after publication of "scleral buckle vs. primary vitrectomy" study, SB surgery has become choice of surgery which is preferred solely in a selected group of patients, namely, young, phakic patients without posterior vitreous detachment.^{6, 7, 9-12}

Moinuddin et al. retrospectively reviewed 751 patients who underwent surgery for primary, uncomplicated RRD during 8-years period, which more objectively reflected real-life data by providing outcomes from a large series. Authors found that PPV was performed in 668 patients (88.9%), PPV plus SB surgery in 51 patients (6.9%) and SB surgery alone in 32 patients (4.2%). It was found that mean age was significantly lower in patients who underwent SB surgery when compared to those underwent PPV. The proportion of phakic patients was 90.3% in SB group and 59.9% in PPV group; in addition, it was found that SB surgery was preferred in only 3 of 295 pseudophakic patients. Authors observed no significant difference in macular involvement between SB surgery and PPV groups. Authors concluded that there was no significant difference in anatomic and

functional success between SB surgery and PPV regardless of age, macular involvement and lens status (phakic/pseudophakic). During follow-up period, cataract surgery was needed in 245 of 413 phakic patients who underwent PPV or PPV plus SB surgery (59.3%) while it was needed in only 1 of 31 patients who underwent SB surgery alone (3.1%).¹³

In another study including 723 patients who underwent surgery for uncomplicated RRD with macular involvement, functional success was compared between patients who underwent SB surgery (n=308) and PPV plus SB surgery (n=415); it was found that functional success was significantly higher in patients who underwent SB surgery.¹²

Although there are many studies demonstrated that there is no significant difference in anatomic and functional success between PPV and SB surgery, PPV is being preferred more commonly and retinal surgeons are increasingly preferring PPV by rising generation.^{14, 15}

In our study, it was seen that SB surgery can be successfully performed in primary, uncomplicated RRD in agreement with previous literature and that SB surgery provides anatomic and functional outcomes comparable with those of PPV in all age groups regardless of macular involvement and lens status.

The SB surgery has some advantages when compared to PPV. SB surgery is associated with lower cost. In SB surgery, the required surgical instruments are buckling material and sutures. In addition, indirect ophthalmoscopy and chandelier illumination are required to visualize retina. Moreover, surgical equipment can be prepared more readily than PPV; thus, time to surgery is shorter. In our study, time from diagnosis to surgery was shorter in SB surgery group when compared to PPV group. However, SB surgery has also some disadvantages including being

more invasive than PPV, longer rehabilitation period and greater pain at postoperative period; appropriate anesthesia and postoperative medical treatment may relieve such disadvantages. In addition, learning curve is longer for SB surgery when compared to PPV.

In conclusion, it is seen that the fact that SB surgery has become less commonly preferred surgical method in the treatment of RDD and has been limited to a selected group of patients cannot be linked to lower efficacy regarding anatomic and functional outcomes in SB surgery. We believe that there is a negative discrimination against training of SB surgery in majority of clinics and the negative discrimination is increasing over time as the retinal surgeons from these clinic have become trainers in ophthalmology clinics. The importance of SB surgery should be emphasized given the economic conditions in our country. We think that further multicenter, comparative studies are needed to place RRD surgery where it deserves.

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