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Original Research

POST VITRECTOMY RETINAL REDETACHMENT AND VISUAL ACUITY DIFFERENCE WITH AND WITHOUT SCLERAL BUCKLING IN RHEGMATOGENOUS RETINAL DETACHMENT

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ABSTRACT

Introduction: Vitrectomy pars plana (VPP) either with or without scleral buckling (SB) is the definitive treatment for rhegmatogenous retinal detachment (RRD). Installation of SB with VPP is still a controversy. There has not been any conclusive evidence regarding whether VPP with SB can give a better outcome compared to VPP alone for RRD patients. This research aimed to assess the difference of retinal redetachment and visual acuity post VPP with and without SB in RRD.

Methods: This observational analytic research used secondary data in the form of medical records from January 2019 – June 2021. Research samples are all RRD cases who has undergone VPP with or without SB in Central Surgical Installation of Sanglah General Hospital Denpasar who fulfill inclusion and exclusion criteria, taken consecutively. A total of 60 samples were obtained. Data collected including age, gender, preoperative visual acuity, onset, RD extension, retinal break location, presence of PVR, macular status, type of tamponade as well as visual acuity and retinal redetachment post-surgery on the first week, first month and second month. Analysis was done using SPSS version 21.

Result: The results showed no significant difference in redetachment risk on multivariate analysis of the two groups. Age, PVR, and macular status contributed to redetachment risk. Multivariate analysis found significant difference in visual acuity of both groups on the second month post-surgery. Onset, macular status, and extent of RD also influences visual acuity prognosis.

Conclusion: This research cannot provide adequate evidence that VPP with SB can give better outcome compared to VPP alone. Although multivariate analysis found better visual outcome in patients treated with VPP with SB, this result was related to onset, macular status and the extent of RD. The disadvantages of VPP with SB involved longer surgery time, post surgical edema and pain. Further research with longer follow up duration, blinding and randomization or RCT can be done for better evidence to determine which is more superior.

Keywords: retinal redetachment, visual acuity, vitrectomy, scleral buckling

Introduction

Retinal detachment (RD) is the detachment of the neurosensory part of the retina from the Retinal Pigment Epithelium (RPE). There are 3 types of RD, which are: rhegmatogenous, tractional and exudative: rhegmatogenous, tractional and exudative. Rhegmatogenous RD is the most common type of RD. Rhegmatogenous Retinal Detachment (RRD) is a type of retinal detachment (RD) caused by a tear in the retina that opens a potential space between the sensory retina and the RPE which then fills with fluid and causes detachment of the sensory retina from the RPE.[1,2,3,4]

The incidence rate of RRD in the United States is 12.6 per 100,000 white population per year. The global incidence of RRD is 1:10,000 population. There is no research regarding the incidence of RRD in Indonesia, but based on the IAPB (International Agency for the Prevention of Blindness) survey, retinal disorders are the fourth cause of blindness in Indonesia. Research at Cicendo Eye Hospital during October 2015 - March 2016 found that out of 77 cases of RRD, 55 patients (71.43%) were male and 22 patients (28.77%) were female. In this study, RRD was most commonly found in the age range of 41-60 years, which is a productive age range. Some of the risk factors that affect the onset of RRD are myopia, family history of RD, retinal tear or RD in one eye, new vitreous detachment, trauma, high-risk peripheral lesions, and vitreoretinal degeneration.[1,2,3,5]

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RRD management or repair involves closing the retinal tear by making contact between the retina and the RPE and choroid for as long as possible so that chorioretinal adhesion (reattachment) can occur which will permanently close the subretinal space. This can be done with vitrectomy pars plana (VPP), scleral buckle (SB) insertion or pneumatic retinopexy. VPP is often performed together with SB to increase the success of the procedure. [1,3]

The scleral buckling procedure involves suturing a silicone band to the sclera circumferentially at the equator of the eyeball. This technique can also be used for the prevention of DR in cases where a giant retinal tear has occurred, or in combination with PPV.[3,6]

Various studies comparing the outcomes of VPP and VPP with SB in patients with DR have been conducted in various parts of the world, with varying results. Research conducted by Lindsell et al. published in 2016 found that VPP with SB provides similar results compared to VPP alone in primary repair for RRD. This study is a retrospective, comparative, interventional and consecutive case series study of RRD cases conducted at the Cincinnati Eye Institute in the United States.[1]

A similar comparison was also conducted by Pragnanda and Iskandar at Cicendo Eye Hospital in 2019. This study found that VPP with SB provided a better anatomical outcome in the VPP with SB group compared to VPP alone, while the visual acuity outcome did not show significantly different results in both groups.[7] This result can be said to be the opposite of the results of the study obtained by Siqueira et al.

A study conducted by Siqueira et al. in 2007 found similar results of retinal reattachment and postoperative complications between VPP and VPP with SB, but the visual acuity in the group of patients who underwent VPP was significantly better than the group of patients who underwent VPP with SB.[8] These studies show inconsistent results between one study and another on outcomes.

This study is expected to contribute to evaluating the effectiveness and safety of VPP with SB compared to without SB, which will be very helpful for the selection of surgical techniques in RRD patients. The results of this study are also expected to support previous studies that are inconsistent between one study and another, and if differences are found, it can be a basis for future studies regarding factors that could potentially affect the difference.

Methods

This study is an analytic observational study using secondary data. Observation (measurement) of the variables studied before the intervention was carried out, then statistical variable exclusion and control were carried out, followed by post-intervention comparative analysis of the two types of actions on the variables studied. The research design is schematically depicted as follows:

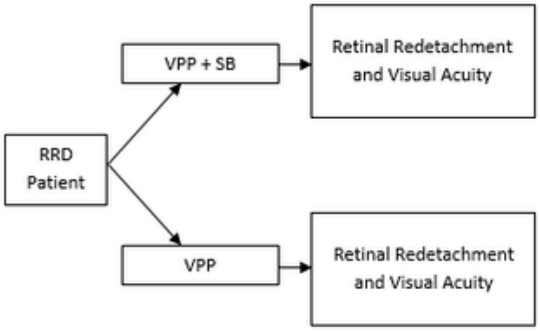

Figure 1. Research Design

The study was conducted at Sanglah Central General Hospital (RSUP) Denpasar, Bali Province by recording and analyzing data on RRD patients who underwent VPP with and without SB in the period January 2019 - June 2021.

The target population was all RRD patients who had undergone VPP with or without SB. The study's target population was all patients with RRD who had undergone VPP with or without SB at the Central Surgical Installation of Sanglah Hospital Denpasar in the period January 2019 - June 2021. If the target sample size is not achieved, there is a possibility to increase the sample size by increasing the study period or adding samples from other locations, namely Bali Mandara Eye Hospital.

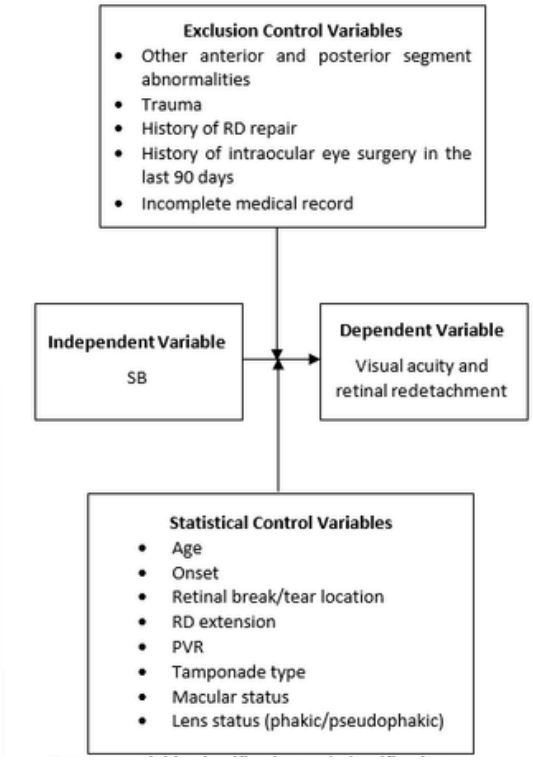

Figure 2. Variable Classification and Identification

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The study sample was all patients with RRD who had undergone VPP with or without SB in the Central Surgical Installation of Sanglah Hospital, Denpasar, who met the inclusion and exclusion criteria and were taken consecutively. The inclusion criteria for this study are as follows: subjects who suffered from RRD and performed VPP with or without SB in the period January 2019-June 2021 and subjects with complete medical records until the first week follow-up, first month and second month postoperatively.

Exclusion criteria for this study were subjects with preoperative conditions: other anterior and posterior segment abnormalities, history of ocular trauma, history of intraocular eye surgery in the last 90 days, history of previous RD repair (VPP/pneumatic retinopexy), or incomplete medical records including follow-up of less than 2 months. The sampling method was consecutive sampling from the medical records of the target population. All identified samples that met the inclusion and exclusion criteria were included in the study until the sample size was met for both groups.

The data obtained will be entered into a table and analyzed with SPSS. Categorical data is displayed in the form of frequency tables and percentages, while numerical data is displayed in the form of means and standard deviations. The data that has been obtained is then converted into tabular form and processed using a computer program consisting of coding, editing, data entry and cleaning.

Statistical tests used in this study consist of data normality tests and hypothesis tests. The normality test was first carried out using the Saphiro-Wilk test because the number of samples <50. If the data is normally distributed, then proceed with the comparative hypothesis test using repeated measurement (ANOVA) for visual acuity, and chi-square (McNamar) for redetachment. If not normal, Kruskal Wallis and Friedman will be used. Multivariate analysis (ANCOVA) was used to determine the effect of preoperative characteristic variables on outcome.

Table 1. Characteristics of the Research Subjects

Characteristics	VPP+SB (n = 30)	VPP (n = 30)
Age (years), median (IQR)	37 (23.5-50)	53.5 (45-57.25)
Gender, n (%)		
Male	18 (60)	16 (53.3)
Female	12 (40)	14 (46.7)
Onset (weeks), median (IQR)	4 (3-13)	4 (3-12)
Lens status, n (%)		
Phakic	26 (86.7)	22 (73.3)
Pseudophakic	4 (13.3)	6 (20.0)
Aphakia	0 (0)	2 (6.7)
RD location, n (%)		
Superior	3 (10)	6 (20)
Superonasal	1 (3.3)	0 (0)
Superotemporal	1 (3.3)	4 (13.3)
Temporal	2 (6.7)	1 (3.3)
Inferotemporal	3 (10)	3 (10.0)
Inferior	15 (50)	13 (43.3)
Total	3 (3.3)	1 (3.3)
Break location, n (%)		
Superior	18 (60.0)	21 (70.0)
Inferior	12 (40.0)	9 (30.0)
Break type, n (%)		
Single	28 (93.3)	28 (93.3)
Multiple	2 (6.7)	2 (6.7)
RD Extension, n (%)		
<900	5 (16.7)	10 (33.3)
≥900	25 (83.3)	20 (66.7)
Degree of PVR, n (%)		
A	4 (13.3)	2 (6.7)
B	22 (73.3)	22 (73.3)
C	4 (13.3)	6 (20.0)
Macular status, n (%)		
On	12 (40)	18 (60)
Off	18 (60)	12 (40)
Tamponade type, n (%)		
SO	16 (53.3)	17 (56.7)
SF6	7 (23.3)	7 (23.3)
C3F8	7 (23.3)	6 (20.0)

*VPP: vitrektomi pars plana, SB: scleral buckling,
RD: retinal detachment, PVR: proliferative vitreoretinopathy

Results

This study obtained a total of 60 samples divided into 2 groups, namely 30 RD patients who underwent vitrectomy with scleral buckling, and 30 RD patients who underwent vitrectomy without scleral buckling. The normality test showed that age and onset data were not normally distributed. The characteristics of the study sample can be seen in Table 1.

In the first postoperative week, all patients in the groups with and without SB did not experience retinal redetachment. At 1 month postoperatively, there was no difference in retinal redetachment in the groups with and without SB (p=0.405). After 2 months postoperatively, anatomical results were found to be better in the VPP with SB group than without SB (p=0.010).

There was a decrease in logMAR (improvement in visual acuity) in both groups (p<0.001). The results of repeated measurement ANOVA test stated that there was no difference in visual acuity after vitrectomy with and without scleral buckling (p=0.35). The difference in visual acuity with and without scleral buckling at pre-operative, 1 week postoperative, 1 month postoperative, and 2 months postoperative can be seen in Table 4.

Table 2. Differences in Retinal Redetachment After Vitrectomy with and Without Scleral Buckling Month 1

Treatment	Anatomical Results		p value	RR	95%CI	
	Redetached	Attached			Lower Limit	Upper Limit
VPP+SB	8 (26.7%)	22 (73.3%)	0.40	0.73	0.34	1.55
VPP	11 (36.7%)	19 (63.3%)				

Table 3. Differences in Retinal Redetachment After Vitrectomy with and Without Scleral Buckling Month 2

Treatment	Anatomical Results		p value	RR	95%CI	
	Redetached	Attached			Lower Limit	Upper Limit
VPP+SB	2 (6.7%)	28 (93.3%)	0.01	0.20	0.04	0.84
VPP	10 (33.3%)	20 (66.7%)				

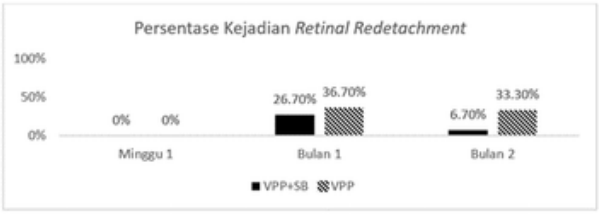

Figure 3. Differences in Retinal Redetachment After Vitrectomy with and Without Scleral Buckling

Table 4. Difference in Visual Acuity After Vitrectomy with and Without Scleral Buckling

Time	Visus (logMAR), mean ± SD		p value
	VPP+SB (n=30)	VPP (n=30)	
Pre-Op	2.09 ± 0.72	2.08 ± 0.61	0.86
1 Week Post-Op	2.21 ± 0.69	2.23 ± 0.66	0.94
1 Month Post-Op	1.47 ± 0.80	1.61 ± 0.84	0.57
2 months Post-Op	1.16 ± 0.82	1.55 ± 0.99	0.15

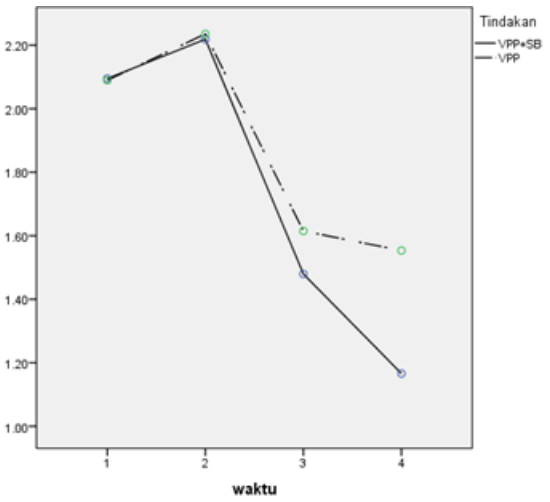

Figure 4. Difference in Visual Acuity After Vitrectomy with and Without Scleral Buckling

Bivariate analysis showed a difference in the incidence of retinal redetachment between VPP with SB and without SB, but multivariate test showed no difference after covariates were controlled. Other factors affecting the difference in results were age, macular status, and degree of PVR. The results of the initial step and final step of the backward stepwise test of the incidence of redetachment are presented in Table 5.

Table 5. Stepwise Backward Multivariate Analysis of Scleral Buckling Wear on Retinal Redetachment with Covariates of Age, Onset, Lens Status, RD Extension, PVR Degree, Macular Status, Break Location, and Tamponade Type

Step	Variabel	P value	Odds Ratio
1	Type of action		
	VPP+SB	0,09	0,14
	VPP		ref
	Age (years)		
	<40 years	0,05	0,02
	≥40 years		ref
	Onset		
	<4 weeks	0,36	4,28
	≥4 weeks		ref
	Lens Status		
	Phakia	0,57	0,61
	Pseudophakia/afakia		ref
	Break location		
	Superior	0,67	0,65
	Inferior		ref
	RD Extension		
	<90°	0,21	0,20
	≥90°		ref
	PVR Degree	0,03	0,02
	Macular Status		
	On	0,02	0,01
	Off		ref
	Tamponade Type		
	SO	0,47	0,43
	Gas		ref
6	Type of action		
	VPP+SB	0,11	0,2
	VPP		ref
	Age (years)		
	<40 years	0,04	0,03
	≥40 years		ref
	Degree of PVR	0,02	0,05
	Macular Status		
	On	0,008	0,04
	Off		ref

There was no difference in bivariate analysis of visual acuity between VPP with SB and without SB, but there was a significant difference between the two groups in multivariate analysis of visual acuity at the second month after covariates were controlled. Other factors affecting visual acuity were onset, macular status and RD extension. The initial step and final step results of the backward stepwise test for the second month visual acuity results are presented in Table 6.

Table 6. Stepwise Backward Multivariate Analysis of Scleral Buckling Wear on Visual Acuity with Covariates of Age, Onset, Lens Status, RD Extension, PVR Degree, Macular Status, Break Location, and Tamponade Type

Step	Variabel	Coefficient of Regression	t	P value
1	Type of action			
	VPP+SB	0,3	2,51	0,02
	VPP			Ref
	Age (years)			
	<40 years	0,05	0,45	0,65
	≥40 years			ref
	Onset			
	<4 weeks	0,18	0,169	0,09
	≥4 weeks			ref
	Lens Status			
	Phakia	0,06	0,57	0,56
	Pseudophakia/afakia			ref
	Break location			
	Superior	-0,44	-0,44	0,66
	Inferior			ref
	RD Extension			
	<90°	0,23	2,24	0,03
	≥90°			ref
	PVR Degree	0,06	0,57	0,56
	Macular Status			
	On	0,63	6,01	<0,001
	Off			Ref
	Tamponade Type			
	SO	0,07	0,72	0,47
	Gas			ref
6	Type of action			
	VPP+SB	0,35	3,76	<0,001
	VPP			ref
	Onset			
	<4 weeks	0,2	2,2	0,03
	≥4 weeks			Ref
	Macular Status			
	On	0,59	6,3	<0,001
	Off			ref
	RD Ekstension			
	< 90°	0,26	2,76	0,008
	≥ 90°			ref

DISCUSSION

The median age of RD patients who underwent VPP with SB in this study was 37.5 years while those who underwent VPP without SB were 53.5 years old. These results are in accordance with the study at Dr. Soetomo Hospital which states that the characteristics of RD patients are mostly 41-50 years old. The study by Haga et al in Japan stated that the incidence of DR was most prevalent in the age group of 50-59 years.[9] Another study conducted in China found that the average age of patients who experienced retinal redetachment after VPP was 40-59 years.[10]

The gender of patients in this study consisted of more men than women, both in groups with SB and without SB. These results are in accordance with research by Jia et al who reported the characteristics of retinal detachment patients who performed VPP were twice as much in men as in women. The study by Guber et al also stated that the characteristics of retinal detachment patients were more common in men.[11] This is thought to be due to differences in eye and vitreous anatomy between men and women. Men have a longer axial length of the eyeball so that retinal detachment is easier to occur.[10]

The median onset between RD events and VPP surgery in this study was 4 weeks. This result is consistent with a study in Pakistan where the waiting time for VPP surgery in patients with DR was mostly 4 weeks.[12] In the study at Cicendo Eye Hospital, the average length of RD onset until surgery was 60 days or about 2 months, longer than the onset at Sanglah General Hospital.[13] Lens status in this study was predominantly phakic, but there was pseudophakia in 13.3% of cases in the group with SB and 20% in the group without SB. The study by Jia et al at Beijing Tongren Hospital reported that one third of RD patients had pseudophakia characteristics.[10] The study by Jia et al in Beijing Tongren Hospital reported that one third of RD patients had pseudophakia characteristics.[14]

The most common location of RD in this study was in the inferior quadrant. A similar study conducted at Cicendo Eye Hospital reported the most common RD in the superior quadrant,[7] while one conducted at Dr. Soetomo Hospital reported the most common RD in the superotemporal quadrant.[14] The most common PVR grade in both groups in this study was grade B. Studies at Dr. Soetomo Hospital and Cicendo Eye Hospital reported the most common PVR grade was grade B. The study by Guber et al reported the characteristics of RD patients at St Gallen Hospital Switzerland consisting of 73 patients with PVR and 841 patients without PVR.[11]

Macular status in the group of VPP patients with SB in this study was more off while in VPP patients without SB was more on. These results are similar to the characteristics of DR patients undergoing VPP in China and in Switzerland, where most macular status is off.[11,15] Different results were reported in a study by Jia et al who stated that the characteristics of DR patients undergoing VPP at a teaching hospital in Beijing had more on macula.[10]

The type of tamponade most widely used in this study in both groups with SB and without SB was Silicone Oil (SO). This characteristic is consistent with the VPP in RD patients in China, which used SO more than gas. In the Swiss study, the type of tamponade that was more widely used was gas. Tamponade functions to replace subretinal and preretinal fluid and attach the retina to the underlying pigment epithelium.[11]

Bivariate analysis revealed a difference in the incidence of retinal redetachment after VPP with and without SB. The use of scleral buckling was found to prevent retinal redetachment with an RR of 0.7 in the first month and 0.2 in the second month. However, this result was found to be insignificant on multivariate analysis after other variables were controlled. This is because based on multivariate analysis, retinal redetachment is influenced by age, degree of PVR, and macular status. Patients who underwent VPP with SB were more likely to be young while VPP without SB were more likely to be old.

Studies comparing the incidence of retinal redetachment after vitrectomy with and without SB in patients with DR have been conducted in various parts of the world, with varying results. There have been 2 RCTs that evaluated the effectiveness of using SB in VPP but they were only published in abstract form and no full articles.

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The abstract results of both RCTs stated that SB was useful in improving retinal reattachment with an RR of 3 and 4.4. However, the findings were inconclusive due to lack of peer review and insufficient information to assess the risk of bias. Therefore, there is no RCT study that can be used as a basis to recommend the use of SB in VPP. Further studies are needed that include specifications of tear extension, location, PVR stage, endotamponade used.[6] Things that were suggested to be investigated in the Guttierez study have been investigated in this study.

A systematic review by Sanhueza and Gonzales in 2020 compared VPP with SB and VPP alone in RD pseudophakia. There are 8 studies that discuss the comparison of VPP with SB and VPP alone in pseudophakia DR and one of them is an RCT. The results of the review stated that the use of SB did not provide changes or only slight changes in retinal reattachment rates and visual acuity, with a low level of evidence.[16]

Research conducted by Lindsell et al in 2016 compared VPP with SB and VPP alone in primary repair RD with a follow-up time of 6 months. The results found that anatomical success in VPP with SB was similar compared to VPP alone (85% vs 83%). This study was a retrospective, comparative, interventional and consecutive case series study of 179 eyes undergoing primary repair of DR at the Cincinnati Eye Institute in the United States.[1]

A retrospective study was conducted by Valeiras et al in 2012 on 101 eyes with DR. The mean follow-up time in this study was 18.4 months. The study found an anatomical success rate of 77.78% in the VPP with SB group compared to 80% in the VPP alone group. This result showed no significant difference in the incidence of retinal redetachment with and without SB.[17] Research by Siqueira et al. in 2007 also found similar retinal reattachment results between VPP with SB and VPP alone (87% vs 85.7%) in 51 RD patients with a follow-up time of 6-18 months.[8] A retrospective study based on medical records in 1212 patients over 14 years by Jia et al reported no significant difference from VPP alone and VPP with SB.

A similar study was conducted by Pragnanda and Iskandar at Cicendo Eye Hospital in 2019. This study compared 46 eyes that underwent VPP with SB and 46 eyes with VPP alone. The follow-up time was 1 week postoperatively. The study found that VPP with SB provided a better anatomical outcome compared to VPP alone (67.4% vs 54.4%). The results of Pragnanda and Iskandar's study are different from this study and other studies because the follow-up time is quite short, which is only 1 week, while in other studies it ranges from 6 to 18 months.[1,8,17]

The results of bivariate analysis showed no difference in mean visual acuity between VPP with SBB and VPP without SB. However, after control variables were controlled, there was a difference in visual acuity that was better in the group with SB. This is consistent with the study by Vangipuram et al who reported that final visual acuity after at least 6 months was significantly better in eyes with VPP+SB than in eyes with VPP alone (logMAR 2.12 vs 1.26; p = 0.011). However, the mechanism of visual improvement after VPP with SB is unknown.[18]

In VPP with SB, SB increases the axial length of the eyeball so that light tends to fall in front of the retina and refractive error in the form of myopia occurs.

Myopia can still have a visus of 6/6 after correction with minus glasses. The study by Lindsell et al reported the mean post vitrectomy vision with SB after 6 months was 20/47 while VPP without SB was 20/43.[1] These results were not significantly different. A cross-sectional study by Pragnanda and Iskandar at Cicendo Eye Hospital also reported no significant difference in visual acuity 1 week postoperatively in the VPP with SB and VPP without SB groups.[7]

Different results were obtained by Siqueira et al, where the visual acuity in the group of patients who underwent VPP alone was significantly better than the group of patients who underwent VPP with SB.[8] These results show that there are still inconsistencies in research regarding the effect of VPP with SB compared to VPP without SB on visual acuity, because there are studies that state that it is not related, VPP without SB is better, or VPP with SB is better.

The variables found to affect the incidence of retinal redetachment in this study were age, degree of PVR, and macular status. Variables found to affect visual acuity were surgery onset, macular status, and RD extension. Age <40 years, PVR degree A, and macular status on were found to be protective factors against the incidence of retinal redetachment while earlier operation onset, extension <90 degrees, and macular status on were protective factors of poor visual acuity. These results are in accordance with research by Jia et al who stated that age above 40 years is a risk factor for retinal redetachment.[10] Age can affect the incidence of retinal redetachment because at the age of more than 50 years, liquification of the vitreous has begun to occur.[14]

This study found no association between onset and retinal detachment but an association between onset and visual acuity. Apoptosis of photoreceptors is said to occur after three days of RD, which can affect visual acuity. This is in line with the study conducted by Wykoff et al, where they found no relationship between waiting time for surgery and anatomical success of vitrectomy.[19] Different things were obtained by Khanzada et al who found good anatomical outcomes in the group that was operated on immediately 1-2 weeks compared to the group that was operated on 4 weeks, 6 weeks and ≥ 6 weeks.[12] Research conducted by Hutabarat et al found 7 eyes that experienced recurrent retinal detachment in the 1–3 month surgery group.[13]

The results of this study are also in accordance with a study by Halberstadt et al which stated that there were no differences in retinal redetachment and BCVA after 6 months after VPP in pseudophakic and phakic eyes.[20] Another study by Guber et al also stated that there was no relationship between lens status and the incidence of retinal redetachment.[11] In pseudophakic eyes, preoperative evaluation and surgical treatment are more difficult because the view is limited to the peripheral fundus, so anatomically, the outcome of reattachment in pseudophakic eyes is thought to be worse than in phakic eyes, but this was not proven in the study.

This study stated superior tears had an OR of 0.65 for retinal redetachment but this result was not significant. This result is similar to Mohamed et al who stated there was no statistical difference in surgical success between inferior and superior tears after vitrectomy.[21] The study by Kobashi et al reported that inferior tears give worse anatomical results compared to superior tears.[22]

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The study by Goto et al mentioned that the postoperative anatomical success of vitrectomy in inferior RD was lower than that in superior RD.[23] This study states that PVR is a risk factor for retinal redetachment. This result is in accordance with previous studies that PVR grade C is a risk factor for retinal redetachment.[11,15,24] The mechanism of PVR is not fully understood but previous theories suggest that retinal pigment epithelium (RPE) cells exit through the retinal tear and proliferate with glial cells to form the epiretinal membrane (ERM). This causes contraction and atrophy of the retina resulting in retinal pulling.[24]

Macular status is very important in determining the prognosis after vitrectomy surgery. Macular status was found to be a significant risk factor for retinal redetachment in studies by Guber et al and Jia et al in 2020. A detached or off macula will lead to poor visual outcome prognosis and may cause blindness.[10,11]

This study states that there is no significant relationship between the type of tamponade and retinal redetachment.[10] This result is in accordance with research by Jia et al which states that the type of tamponade is not significantly associated with the incidence of retinal redetachment. Different results were obtained by Guber et al who stated that SO was significantly associated with a higher incidence of retinal redetachment. The type of tamponade is usually chosen based on the severity of retinal detachment. The incidence of retinal redetachment was found to be higher in SO because SO tamponade is usually used in more complex retinal detachments, for example in PVR detachment or extensive retinal tears.[11]

CONCLUSION

This study found no significant association in the incidence of redetachment in RRD patients who underwent VPP with and without SB, after controlling for preoperative characteristics. The control variables that influenced the incidence of retinal redetachment were age, PVR, and macular status. A significant association was found in the multivariate analysis of visual acuity, and the factors of onset, macular status and extension of RD were associated with differences in visual acuity in RRD patients undergoing VPP with and without SB.

This study has several weaknesses, including being a retrospective study based on secondary data, namely medical records, so that there are still biases, one of which may affect selection bias where there is a tendency or preference for VPP with SB in patients with younger age groups. This study is a quasi-experimental study. Prospective randomized clinical trials are needed to provide a stronger level of evidence. This study also did not analyze the appearance of postoperative cataracts, which will certainly affect vision. In VPP, both SO and gas tamponade as well as instrument manipulation may nudge the lens when the posterior chamber is narrow, leading to secondary cataracts.

This study is expected to contribute to recommending the selection of surgical techniques in patients with RRD.

The results of this study cannot conclude that VPP with SB can provide better outcomes than VPP alone, because although multivariate analysis found significant differences where VPP with SB provided better visual acuity, this was related to the onset, macular status and extension of DR. The impact of VPP with SB is longer operation duration, edema and postoperative pain. Studies with longer follow-up time and studies with blinding and randomization or RCTs can be conducted to obtain better evidence to determine which action is superior.

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