JOHA
Journal Of Health Academics

ASSOCIATED FACTORS OF THE SURGICAL OUTCOME AND THE PERCEIVED SATISFACTION ON THE IMPROVEMENT OF VISION AMONG THE PATIENTS UNDERGOING SURGERY FOR RHEGMATOGENOUS RETINAL DETACHMENT AT THE PREMIER EYE HOSPITAL OF SRI LANKA

Wannigama E[1], Gunarathne HWNN[2]

[1]Consultant Opthalmologist Provincial General Hospital Badulla, Sri Lanka, [2]Consultant Dermatologist Provincial General Hospital Badulla, Sri Lanka

Corresponding Author: erandamailbox@gmail.com

ABSTRACT

Rhegmatogenous retinal detachment (RRD) could threaten the vision. Therefore, early interventionis crucial. This prospective longitudinal study comprised 156 patients who were treated at the NEH, Sri Lanka. Patients with combined retinal detachments and RRD following trauma were excluded. Data were collected using two interviewer-administered questionnaires and a data extraction sheet. Patients were followed-up at one month and six months post-operatively. Satisfaction was assessed based on a pre-determined scoring system. Factors associated with anatomicaland functional outcome were determined using chi-square test. Prevalence odds ratio was used as the effect measure. Significance level was considered as5%. The data showed that RRD common in older male adults. Most patients (n=118) were had successful retinal re-attachment, while macular-on patients presented a statistically significant successful retinal re-attachment compared to those with macular off (96.0%versus 71.4%, p=0.01). No significant association was seen in relation to age (p=0.59), sex (p=0.89) and presence of co-morbidity (p=0.34). One month following the intervention, a statistically significant decline of BCVA was observed (p=0.000). At six months, there was a significant improvement of vision (p=0.001). BCVA in six months postoperatively was significantly improved with early presentation (p=0.001) and early

intervention(p<0.001). In most post-operative patients, both activities of daily living (n=107, 68.6%) and extended activities of daily living (n=125, 80.1%) were affected. Patients with Early presentation (p=0.000), early intervention (p=0.013), macular-on (p=0.04) and absent PVR (p=0.000) showed better activities of daily living. Age (p=0.22) and sex (p=0.53) did not show a significant association. Eighteen (11.5%) out of the 129 patients experienced a well satisfied composite scores change whereas 27 (17.3%) experienced no improvement in satisfaction. Early intervention for RRD has proven better anatomical outcomes. Therefore, should pay attention to reduce waiting time for treating RRD.

Keywords: Activities of daily living; Outcome; Associated factors; RRD; Satisfaction

INTRODUCTION

Rhegmatogenous retinal detachment (RRD), occurs due to detachment of the neurosensory retina owing to a defect in the retina from the underlying retinal pigment epithelium.[1] It occurs with a varied incidence of 6.3 to 17.9 per 100 000 persons per year worldwide.[2] Techniques for the management of RRD include scleral buckling (SB), pars plana vitrectomy(PPV) and pneumatic retinopexy, alone or in combination[4] retinal reattachment with a single procedure is recognized to be associated with better visual outcome [4] with rates of 85% - 90%.[5] It is reported that macula-off RRD has a poor prognosis in most of the cases both in central visual function and visual acuity. [6]

The early and late complications of surgery vary due to several underlying factors such as primary disease itself, surgical procedure, and the tamponade. However complications following RRD surgery may have unfavorable effects particularly, on visual acuity. Lai MM *et al* (2011) reported long term surgical complications of several surgical procedures. The long-term postoperative complications including epiretinal membrane (ERM) (n=29, 22.8%), cystoid macular edema (n=18, 14.2%), persistent intraocular pressure (IOP) elevation (n=17, 13.4%), PVR (n=20, 15.7%), anisometropia (n=15, 11.8%), extraocular muscle dysfunction/diplopia (n=2, 1.6%), and macular hole (n=2, 1.6%) were reported. [8]

A prospective study which was conducted among 92 RRD patients who underwent surgery between January 2004 and December 2006 in the United States of America reported the health – related quality of life and self –rated satisfaction. Through face to face interview, health –related quality of life and self-related satisfaction were assessed preoperatively and at 3 month, 1 –year and 3 – year period. The positive quality of life changes were reported in 62 patients. As compared to preoperative values, self-rated satisfaction improved in 86 patients with a statistically significant

increase in mobility. [9]

Even though studies related to the rhegmatogenous retinal surgery are common in developed settings, documented literature is scarce in developing countries. The current study aimed to determine the anatomical and functional outcome and the perceived satisfaction among the patients undergoing surgery for RRD in Sri Lanka. Thus the findings could bridge the evidence gap in a developing setting.

METHODS

A prospective longitudinal study was conducted at National Eye Hospital in Sri Lanka in 2018-19. Patients with rhegmatogenous retinal detachment consisted of the study population. Exclusion criteria encompassed cases of combined RRD and RRD resulting trauma. The sample size was calculated using the statistical formula of Lwanga & Lemeshow. All prospective participants who met the eligibility criteria were invited to be recruited. An interviewer-administered questionnaire and a data extraction form were used. Two interviewers administered questionnaires. The collected data was then meticulously entered and analyzed using a statistical package for software sciences.

The analysis was done with Statitical Package for Social Sciences (Version 25). Folloiwng normality assessments, vision at month and six month follow up were compared with baseline vision using paired t-test. Factors associated with functional and anatomical outcome among the patients undergone surgery for RRD were identified using the chi-square test. A multivariate logistic regression analysis was conducted to identify the factors associated with functional outcome independent on cofounders. Significance level was considered as 5%.

RESULTS

The data were collected from 156 patients, with a response rate of 99.4%. The majority were in the age group of above 45 to 60 (n=65, 41.7%) years followed by age of above 60 (n=53, 34.0%) years. Most were male (n=101, 64.7%) and male: female ratio was 1.83: 1. Most of the patients (n=88, 56.4%) had their highest level of education up to primary education.

Approximately half the patients (n=84, 53.8%) reported having chronic medical condition. Among associated co-morbidities, hypertension and myopic were the commonest with a prevalence of 24.4 and 18.6 per 100, respectively. Left eye (n=87, 55.8%) was affected more

than the right. Ten percent (n=16,10.3%) presented with 0.0 visual acuity in the good eye, while 6.4% (n=10) had 1.0 Of visual acuity. The majority of eyes with detachment had subtotal retinal detachment (n=43, 27.6%), followed by total or superior detachment. (n=40, 25.6%). Horseshoe shaped tears were the most common tear type. (n=97). Macula-off detachment was presented in 84.5% (n=131) patients. PVR was present in most of the patients (n=147, 94.2%) and nearly one third (n=53, 34.0%) of patients reported Grade A PVR. In Right eye commonest location of the tear was seen in 11' 0 clock position (n=22, 24.1%), while in left eye commonest location was 2'clock position(n=15, 21.7%).

The mean (SD) duration between the symptom appeared and the intervention was 13.6 (12.8) days. For the duration between diagnosis and intervention, it was 14.23 days (SD 0.80). Various techniques were employed for repair, including pneumatic retinopexy, scleral buckle or vitrectomy, or combinations. TriPort pars plana vitrectomy+SIO was the most common type of intervention (n=82, 52.6%), followed by TPPV+SIO+ECB (n=40, 25.6%). Relaxing retinotomy and sio was done for 7.7% (n=12) patients. Forty nine percent (n=76) eyes left phakic at the completion of surgery. Complicated cataract was observed among 66 (n=42.3%) patients. Laser treatment was done in most of the patients (n=147, 94.2%),while a fewer percentage (n=9, 5.8%) had undergone cryotherapy.

After SIO removal retinal reattachment present in 93(59.6%) patients following single surgery. Re-detachment surgery was carried out in 63 (40.3%) patients. In most of the patients (n=118, 75.6%), anatomical attachment was success. However, in 38 (24.3%) retina was re-detached under silicon oil even after multiple surgeries

BCVA was checked in pre-operatively and post operatively at 1 month and 6 months period. Visual improvement occurred in among less than half of the patients (48.7%), while 24.4% reported same vision and worsened in 26.9% patients. Best corrected visual acuity was statistically significantly (p=0.001) improved with a mean of 1.53 (SD=0.90) six months after the intervention for RRD. Best corrected visual acuity significantly improved six months. Patients with age less than 45 years reported better BCVA after the intervention compared to the age above 45 years, however the findings were statistically not significant (p=0.179).

Higher number of patients presented with macular-off RD compared to macular-on RD (84.0 versus 16.0). Patients with macular-off (mean=3.71, SD=1.21 days) had significant late presentation compared to the macular-on RD (p<0.001). Patients with macular-off (mean=3.71, SD=1.21 days) had significant late presentation compared to the macular-on RD (p<0.001). Compared tomacular-off RD (mean=1.67, SD=0.85 days) macular on patients

had significant improvement in vision (mean=0.75, SD=0.74 days) (p<0.001).

Table 1: Status of Activities and extended activities of daily living after the intervention of RRD

Characteristics	Frequency (Total=156)	Percentage
Activities of daily living		
Affected	107	68.6
Not affected	49	31.4
Extended activities of daily living		
Affected	125	80.1
Not affected	31	19.9

Both activity of daily living (n=107, 68.6%) and extended activities of daily living (n=125, 80.1%) were affected in most of the patients. Complications following intervention for RRD described in Table 1

Table *2: Complications following intervention for RRD*

Complications	Early complications		Late complications	
	Frequency (Total=67)	Percentage (%)	Frequency (Total=13)	Percentage (%)
None	6	8.9	6	4.5
Cataract	4	5.9	46	34.1
Glaucoma	36	53.7	11	8.1
Re-detachment	8	11.9	30	22.2
Macular oedema	5	7.4	0	0.0
Macular scar	0	0.0	7	5.2
Emulsification of oil	0	0.0	15	11.1
ERM	0	0.0	11	8.1
Refractive error	0	0.0	6	4.4
Vitreous hemorrhage	8	11.9	3	2.2

Out of the 67 who reported early complications, most were (n=36, 53.7%) having glaucoma

followed by re-detachment and vitreous hemorrhage. Amongthe patients who reported late complications, cataract was common (n= 46, 34.1%) followed by re-detachment (n=30, 22.2%).

Predictors of anatomical and functional outcomes

Anatomical outcome was assessed by retinal attachment in relation to factors such as age, sex, co-morbidity, macular off/on. Out of these age (p=0.59), sex (p=0.89) and presence of comorbidity (p=0.34) did not show a significant association. A significantly higher proportion of success was seen among those with macular-on detachment (n=24, 96.0%) compared to those with macular-off (n=94, 71.8%) (p=0.01), giving a 1.59-fold higher success with macular-on. In phakic eyes, the anatomical success rate was 80.3% compared to 71.3% in pseudophakic eyes.

Association between factors influencing the functional outcomeamong the patients undergoing surgery for RRD (n=156)

Age (p=0.22) and sex (p=0.593) did not show a significant association with functional outcome. Having a shorter duration than 10 days between symptoms and intervention was associated with a better activity of daily living (p<0.001) . Similarly, statistically significant effect was seen among patients with waiting time of less than 10 days compared to more than 10 days of waiting time (p=0.013). A considerably higher proportion of patients (p<0.001) without an impact on activities of daily living was seen among patients not having PVR (n=9, 100.0%). Similarly those with and macular-on (n=15, 60.0%) compared to those with macular-off (n=34, 26.0%) (p=0.001), had a 4.28-fold likelihood for not affecting activities of daily living.

None of the independent variables entered into the multi-variate analysis (macular status, duration between symptom and surgery, duration between diagnosis and surgery, PVR) had a standard error greater than 2.0.[26] Of the four independent variables considered in the LR analysis, one was found to be with an independent predictor; duration between diagnosis and surgery (adjusted OR=3.85; 95% CI: 1.97-7.53).

Self-reported satisfaction after intervention for RRD is described in Table 3.

Table 3: Self-reported satisfaction after intervention for RRD

Self-reported satisfaction	Frequency(n) (Total=156)	Percentage(%)
Not improved	27	17.3
Slightly improved	80	51.3
Improved, can performed activities with help	21	13.5
Improved, can performed activities	10	6.4

The self-rated satisfaction finally improved in 129 patients as compared with preoperative degrees. Eighteen (11.5%) of the 129 patients experienced a well satisfied composite scores change, and 27 patients (17.3%) did not experience such a change.

DISCUSSION

This is the first documented study, done in Sri Lanka, to assess the associated factors of the anatomical and functional outcome and the perceived satisfaction on the improvement of vision among the patients undergoing surgery for RRD. The study confirmed the success of the surgery in improving BCVA at post-operative 6 months and the overall satisfaction of the clients. Furthermore, this study revealed important positive and negative factors associated with a BCVA as well as with anatomical and functional outcome.

In the present study, macula-off detachment was seen in 84.5% (n=131) of the participants. In addition, PVR was present in most of the patients (n=147, 94.2%). These could have affected the post-operative anatomical and functional outcome greatly. Nearly one third (n=53, 34.0%) of patients reported Grade A RD in which the retina presented with fresh detachment without folds or epiretinal changes. The vitreous traction and the break location were most common in the upper retinal quadrants (n=109, 55.8%) in the present study, which is the common location and commonly presented in a study by Golubovic M (2013) [10]

In general, a good anatomical outcome is expected to be observed following the intervention for RRD. The present study showed that the anatomical success in most of the patients (n=118, 75.6%). Similarly, a study done in Scotland showed the primary anatomical success following index surgery as 90.8%, while the secondary outcome (anatomical success following repeat surgery) was 98.46%. Another study from Germany which analyzed results

of retinal detachment surgery 12 years earlier, namely from 2006-2008,showed a much higher primary attachment rate of 96.1% compared to the present study.{6} The improvement in surgical results can be attributed to the continuous technical developments in developed countries compared to developing countries. Thus, the anatomical success rate depends on the underlying factors and type of surgery which can be varied in different settings.

Young adults tended to have a higher primary success rate in the current study which could be due to the fact that younger people are known tohave less vitreous syneresis, better pumping effect, and stronger reparative ability of the retina pigment epithelium than the elderly. [7] A study in Taiwan also showed the significant anatomical outcome (odds ratio: 1.13, 95% confidence interval (CI): 1.06–1.21) among young patients after excluding the covariates. Yet, in that study, sex, duration of retinal detachment, preoperative best corrected visual acuity, macular involvement, break type, extent of detachment, and surgical procedure did notshow such significant associations [7].

Post-operatively, activities of daily living getting unaffected was significantly associated with: the duration of less than 10 days between symptoms and intervention ($p<0.001$), waiting time less than 10 days for intervention ($p=0.013$), macular-on ($p=0.04$) and absent PVR ($P<0.001$) in the present study. No such significant associations could be observed in age ($p=0.22$) and sex ($p=0.53$). Furthermore, multivariate logistic regression analysis showed the duration between diagnosis and surgery had higher risk for not affecting the activities of daily living after adjusting for confounders (adjusted OR=3.85; 95% CI: 1.97-7.53). Thus, the timing of surgical intervention is critical in patientswith RRD, because the longer the photoreceptors are separated from the retinal pigment epithelium, the greater the structural alterations in the retina. Kim JD, *et al* (2013) reported that the time between onset of symptoms and surgery for RRD was found statistically significant association ($p=0.001$), which was similar to the present study [4].Therefore, reducing waiting time is very crucial in better outcome of the surgery, which should be one of the important findings to hospital administrators to improve the quality service.

One of the main early postoperative complications was postsurgical macular edema (7.4 %%) in the present study. Berrod *et al* (2016) [12] and Schmidt et *al* (2019) [11] have described a lower incidence of macular oedema (4.4%). Another known complication of vitrectomy is the postoperative progression of cataract development, which was present early in 4 patients (5.9%) and in 42 (34.1%) aslate complications the current study. Thus, cataract surgery was performed after a mean of 15 months in these two studies.

Literature says the incidence of a postoperative development of an ERM ranges from 4 to 8%[13] The incidence in the present study was 8.1%, which is similar (7.0-15.0%) to the results of a recent study presented by Schmidt *et al* (2019)[11]. The self-rated satisfaction finally improved in 129 patients (82.7%) as compared with preoperative degrees in the present study, while 27 patients (17.3%) did not experience such a change. Moreover, eighteen (11.5%) of the 129 patients reported a well satisfied change. however, satisfaction could be varied according to the self- perceived expectations. Therefore, a further study is recommended to assess the self-rated quality of life and satisfaction following RRD in a greater detail.

The current study had several limitations. Although sampling size was adequate, a lesser number of patients presented in some subgroups (e.g. complications of the surgery), which makes difficult in comparison among these subgroups. Self-rated satisfaction was reported at six months of the postoperative period according to five scores; thus, it provides the superficial findings for self-rated satisfaction following RRD.

CONCLUSIONS

Most patients in the study achieved successful anatomical attachment following retinal detachment surgery. Visual improvement occurred in less than half of the patients, with substantial percentage experiencing no changed or worsening of vision. Patients with macular involvement at the time of detachment had significantly better retinal attachment success. Age, sex, comorbidities did not show significant association with outcomes. Early complications, primarily glaucoma, vitreous hemorrhage, and retinal re-detachment, were observed in subset of patients. Cataract was a common late complication. Early diagnosis and intervention for retinal detachment are strongly recommended. Further research is needed to explore complications in larger patient groups and to assess factors associates with these complications. Additionally, detailed assessment of self-reported patient satisfaction will be beneficial in planning intreventions to improve post-surgery quality of life.

REFERENCES

1 D'Amico DJ. Primary retinal detachment. New England Journal ofMedicine. 2008 Nov 27; 359(22):2346-54.

2 Chandra A, Banerjee P, Davis D, Charteris D. Ethnic variation in rhegmatogenous

retinal detachments. Eye. 2015 Jun; 29(6):803-7.

3 Sodhi A, Leung L-S, Do D V., Gower EW, Schein OD, Handa JT. RecentTrends in the Management of Rhegmatogenous Retinal Detachment.Surv Ophthalmol. 2008; 53(1):50-67. doi:10.1016/j.survophthal.2007.10.007

4 Kim JD, Pham HH, Lai MM, Josephson JW, Minarcik JR, Von Fricken M. Effect of symptom duration on outcomes following vitrectomy repair ofprimary macula-off retinal detachments. *Retina*. 2013; 33(9):1931-1937.doi:10.1097/IAE.0b013e3182877a27.

5 Al-Hinai A, Al-Abri M. Outcome of rhegmatogenous retinal detachment repair: Experience of a tertiary center in Oman. Oman J Ophthalmol. 2013;6(3):179. doi:10.4103/0974-620X.122274.

6 ÖZGÜR S, Esgin H. Macular function of successfully repaired macula-off retinal detachments. Retina. 2007 Mar 1; 27(3):358-64.

7 Cheng SF, Yang CH, Lee CH, Yang CM, Huang JS, Ho TC, Lin CP, Chen MS. Anatomical and functional outcome of surgery of primary rhegmatogenous retinal detachment in high myopic eyes. Eye. 2008 Jan;22(1):70-6.

8 Lai MM, Khan N, Weichel ED, Berinstein DM. Anatomic and visual outcomes in early versus late macula-on primary retinal detachmentrepair. Retina. 2011 Jan 1; 31(1):93-8.

9 Zou H, Zhang X, Xu X, Liu H, Bai L, Xu X. Vision-related quality of life and self-rated satisfaction outcomes of rhegmatogenous retinal detachment surgery: three-year prospective study. PLoS One. 2011; 6(12).

10 Golubovic M. Rhegmatogenous retinal detachment and conventional surgical treatment. Prilozi. 2013 Jun 1; 34(1):161-6.

11 Schmidt I, Plange N, Rößler G, Schellhase H, Koutsonas A, Walter P, Mazinani B. Long-term Clinical Results of Vitrectomy and Scleral Bucklingin Treatment of Rhegmatogenous Retinal Detachment. The Scientific World Journal. 2019; 2019.

12 Berrod JP, El Kouhen N, Leroy BP, Conart JB. Incidence and risk factors ofcystoid macular edema after retinal detachment surgery. Acta Ophthalmologica. 2016 Oct;

13 Adelman RA, Parnes AJ, Ducournau D, European Vitreo-Retinal Society (EVRS) Retinal Detachment Study Group. Strategy for the management of uncomplicated retinal detachments: the European vitreo-retinal society retinal detachment study report 1. Ophthalmology. 2013 Sep 1;120(9):1804-8.

