

SURGICAL AND VISUAL OUTCOMES OF RETINAL DETACHMENT SURGERY IN EYES WITH CHORIO-RETINAL COLOBOMA

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ABSTRACT

Objective: To evaluate the anatomical and visual outcome of surgical management of retinal detachment associated with chorio-retinal coloboma.

Study Design: Prospective interventional case series

Place and Duration of Study: This study was conducted at AI-Shifa Trust Eye Hospital Rawalpindi from Jan 2012 to Dec 2013.

Material and Methods: Twenty one eyes (21 patients) that underwent surgery for retinal detachment associated with chorio-retinal colobomas were selected. Evaluation was done on the basis of type of intervention, final visual acuity and anatomical outcome and complications. Out of 21, 19(90.47%) eyes underwent pars plana vitrectomy with silicone oil (SO) and 2(9.52%) underwent primary scleral buckling surgery. SO was removed in 9 (47.36%) eyes at final follow up. Encircling band was placed in 12 (63.15%) eyes based on peroperative judgment of surgeon. Intra-operative lensectomy was performed in 6 (28.57%) eyes. The main outcome measures were retinal re-attachment and visual recovery. Statistical analysis was performed using "IBM statistical package for social sciences (SPSS) Statistics" (version 17.0, Chicago, Illinois, USA). Qualitative variables were described using percentage; quantitative data were defined using mean \pm standard deviation. The pre op and post op frequency of best corrected visual acuity (BCVA) was compared using Wilcoxon Signed Ranks Test. Confidence interval was 95% (level of significance $p < 0.05$).

Results: The mean number of operations per eye were 1.57 ± 0.74 ; mean follow-up was 13.1 months (range 12-18). The retina remained attached in 18 eyes (85.71%) at final follow-up. The post op BCVA improved significantly as compared to pre op BCVA ($p < 0.01$). Mean pre op BCVA was counting fingers (CF) and mean post op value of BCVA was 3/60.

Conclusion: Pars plana vitrectomy along with silicon oil tamponade for retinal detachment related to chorio-retinal coloboma improves the long-term anatomical outcome however no significant improvement in visual acuity was observed.

Keywords: Coloboma, Pars plana vitrectomy, Retinal detachment.

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INTRODUCTION

The chorioretinal coloboma is a congenital lesion characterized by the absence of normal retina, retinal pigment epithelium and choroid^{1,2}. This developmental anomaly is caused by the failure of closure of fetal fissure and is often associated with several other ocular anomalies, including iris coloboma, loss of inferior lens zonules, cataract and optic disc abnormalities. This condition occurs in 0.14% of the general

ophthalmic population³. Retinal detachment (RD) has been reported to occur in 8-50% patients with retinal coloboma⁴.

If RD is secondary to retinal breaks outside the colobomatous area, it can be treated by scleral buckling; however, when the coloboma is etiologically responsible for RD⁵ management options are different⁶. Outcome of RD surgery accompanying chorio-retinal colobomas is not as satisfying as that in general population. Anatomical success rates of surgery in such eyes range from 40% to 100%^{8,15}. Anatomical alterations in colobomatous eyes such as retinal thinning, staphylomatous and thinned sclera and

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involvement of disc and macula as well as lack of choroid and retinal pigment epithelium makes the surgery technically difficult and therefore the prognosis is less satisfactory^{3,4}.

In this study, we report the method of surgery along with anatomical and functional outcome in eyes undergoing retinal detachment surgery for chorio retinal coloboma.

MATERIAL AND METHODS

It was a prospective study carried out after approval from institutional ethical committee. Any patient with previous history of ocular surgery or laser were excluded from the study. Twenty one eyes (21 patients) with RD related to chorio-retinal coloboma were included in the study. Best corrected visual acuity (BCVA) of all the patients was observed pre and post operatively through Snellen's chart. Ophthalmoscopic examination using slit lamp and indirect lens along with intraocular pressure (IOP) measurement in pre and post operative subsequent follow up was done.

Pars plana vitrectomy with silicone oil (SO) was done in 19 (90.47%) eyes and 2 (9.52%) eyes underwent primary scleral buckling surgery. Patients with peripheral retinal breaks were treated with conventional scleral buckling surgery. Eyes with posterior holes and rhegmatogenous RD with no detected holes were considered as candidate for vitrectomy procedures.

Anatomical success was defined as attachment of sensory retina with retinal pigment epithelium with no residual subretinal fluid.

Qualitative variables were described using frequency and percentage. Quantitative data were defined using mean \pm standard deviation. Statistical analysis was performed using "IBM package for social sciences (SPSS)" (version 17.0, Chicago, Illinois, USA). Qualitative variables were described. The pre op and post op frequency of BCVA was compared using marginal homogeneity test. Confidence interval was 95% (level of significance $p < 0.05$).

The surgical management involved pars-plana vitrectomy and scleral buckling surgery after informed consent. Retinal breaks were detected in 11 eyes (52.4%) preoperatively; 2 of these eyes underwent scleral buckling surgery and others underwent vitrectomy. Preoperatively proliferative vitreoretinopathy (PVR) grade C was present in 13 (61.9%) eyes. Ten eyes had posterior PVR only and the other three eyes had only anterior PVR.

Two eyes (9.52%) underwent primary scleral buckling surgery, with encircling silicone sponge (No. 506) in one eye and with encircling silicone band (No. 42) in other eye. Cryopexy was done to suspicious areas and breaks. Subretinal fluid was drained through a tiny hole in the sclera at the maximum height of the detached retina at the site that would be covered by buckle. One of these two eyes experienced retinal redetachment secondary to PVR underwent pars planavitrectomy with SO tamponade.

Nineteen eyes (90.47%) underwent pars plana vitrectomy. Vitrectomy surgery was performed in a standardized fashion employing a three-port 20G pars plana approach. Scleral buckling with an encircling band (No. 42) was done in 13 cases with proliferative vitreoretinopathy (PVR) grade C. The lens was removed in 6 eyes (28.57%) due to existing cataract. Then, simultaneous air-fluid exchange along with internal drainage was performed through the retinal break at the margin of, or within, the chorio retinal coloboma. In case of 5 eyes endodiathermy was performed.

All eyes underwent intraoperative laser photocoagulation therapy (two rows of diode endolaser) around the colobomatous area and retinal breaks followed by air/fluid exchange. The areas of the macula, disc and papillomacular bundles were spared from laser. Silicone oil (SO) (5000 centistokes) was used as internal tamponade in all eyes. In silicone oil filled aphakic eyes, inferior iridectomy was not needed in majority of cases due to coloboma of iris. Patients

were placed in prone position for one week postoperatively.

Among the 19 eyes, 9 (47.36%) underwent SO removal. Reasons for not removing the SO in rest of the 10 patients were noncompliance of the patients and unwillingness of patient to undergo surgery again. The interval between SO injection and removal ranged from 3 to 12 months (mean 4.2 months). Of 9 eyes under going SO removal, 2 had redetachment of the retina therefore revised surgery was required.

RESULTS

Data of 21 eyes (21 patients) who had underwent surgery for RD accompanying chorioretinal colobomas were evaluated. Involvement of the right eye was 12 and that of left eye was 9. Mean age of patients was 17.32 ± 9.62 (range 4 to 40) years. Patient demographics as well as baseline clinical characteristics are shown in table-I.

Preoperatively the details of best corrected visual acuity (BCVA) were; 4 (19%) patients had perception of light (PL), 7 (33.3%) had hand movement (HM), 4 (19%) had counting finger

The post op BCVA improved significantly as compared to pre op BCVA (*p*<0.001). Mean pre op BCVA was CF and mean post op value of BCVA was 3/60.

Nineteen (90.47%) eyes underwent pars plana vitrectomy with SO and 2(9.52%) eyes underwent scleral buckling surgery. Redetachment occurred in 3 eyes (14.2%), of which two eyes (10.52%) from vitrectomy and one eye (50%) from scleral buckle surgery. The recurrence was caused by PVR changes in two cases and new breaks outside the coloboma in one case. Revised surgery involved membrane peeling and injection of SO if the first surgery was with scleral buckling and removal of membranes under SO in eyes with SO. Retreatment of the coloboma border was done with laser during reoperation. At final follow up two of these three cases developed persistent retinal detachment which did not undergo subsequent surgery due to poor visual prognosis. Of the 9 eyes that underwent SO removal, two had retinal re-detachment due to PVR changes and eventually underwent revised surgery. Retina remained attached at final follow

Table-I: Baseline clinical features of patients with colobomatous retinal detachment.

Parameters	Mean ± SD	range	Percentage
Age (years)	17.3 ± 9.6	4-40	
Intraocular pressure (mmHg)	11.9 ± 5.2	10-24	
Female/Male ratio	10/11		
Cataract	6		28.57%
Associated abnormalities			
Iris coloboma	16		76.2%
Macular coloboma	7		33.3%
Disc coloboma	12		57.14%
Nystagmus	9		42.8%

(CF), 1 (4.8%) had 3/60, 3 (14.3%) had 2/60, 1 (4.8%) had 1/60, and 1 (4.85%) had 6/36. Post operatively frequency of PL was 2 (9.5%), HM was 3 (14.2%), CF was 2 (9.5%), 3/60 and 2/60 was in 1 patient (4.8% each), 1/60 in 6 (28.6%), 6/60 in 4 (19%), 6/36 and 6/24 in each 1 patient (4.8%).

up in all eyes except one that got re-detached due to new break but no intervention was done due to poor visual prognosis.

Post subcapsular cataract in 4 (26.6%) and epithelial defect in 3 (14.2%) cases and were managed on medical treatment without necessitating early SO removal.

DISCUSSION

The average duration of follow up in the current study was comparable to previous studies ranging from 13.47 to 149 months for RD surgery in coloboma. Retinal reattachment was observed in 85.71% cases which is similar to prior studies reporting it in 81.2%⁷, 87.5%¹⁰, and 100%¹¹⁻¹³ cases. Those studies however, included only vitrectomized colobomatous eyes while excluding eyes undergoing SB. Although scleral buckle can be considered as a treatment modality in eyes with colobomatous RD⁹, reported anatomical outcome in the literature (35% to 57%) have not been satisfactory. This is due to difficulty in locating the retinal breaks, their posterior location and inability to create adequate chorioretinal adhesions around the coloboma by cryo or laser.

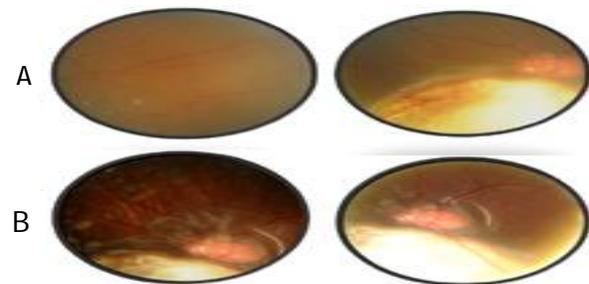
Scleral buckling has been performed using an encircling element or with two radial buckles around the colobomatous¹⁴ with a success rate of only 35%. Jesberg and believed that colobomatous eyes are not suitable for SB surgery. Most reports on SB surgery in colobomatous eyes date back to decades ago^{13, 14}. There has been a decline in the trend towards SB operations in colobomatous eyes; however, in case of a definite peripheral break, SB may still be considered as the first choice⁹.

Encircling SB was the preferred method in only 2 of 21 eyes (9.52%) in our study due to presence of peripheral break and fresh detachment. The preferred surgical procedure in our study was vitrectomy in 19 (90.47%) eyes. Vitrectomy with SO tamponade was successfully employed for colobomatous RD for the first time in 1983¹⁶. Since then, it has frequently been used by different experts^{6,10-12}. Twelve eyes (63.15%) in the current study received an encircling band at the time of vitrectomy. This procedure has been used in fewer cases in similar studies. In the study by Gopal et al⁸, 82.4% of vitrectomies included an encircling element. Without referring to any statistics, the authors concluded that placing an encircling band had no beneficial

effect. In the report by Pal et al¹⁰, only 38% of eyes received an encircling element.

Lensectomy was performed in 6 (28.57%) of phakic eyes in our study. Lensectomy in addition to vitrectomy was performed in 71.4%⁹ and 83.5%⁷ of eyes with colobomatous RD in two other reports. To achieve good visualization during vitrectomy, removal of a cataractous lens is necessary. It may also help the surgeon to trim the vitreous base and facilitate management of pathologies in this area.

SO has been preferred for tamponade in colobomatous RD repair by most surgeons.^{6,7,10-12}. In the study by Gopal et al⁷, it was used in 80 of 85 eyes (94%); 3 of the 5 eyes who received gas at the end of the operation, suffered with retinal re-detachment. The authors concluded that gas is not a suitable tamponade because these eyes require a long term effect over the entire edge of the coloboma. None the less, the authors of



A) Before surgery, B) After surgery

Figure: Attached retina after PPV and silicone oil in case of retinal detachment with chorioretinal coloboma.

another study recommended long acting gas tamponade (C3F8) if the eye does not demonstrate severe proliferative changes.⁸ In our study, all eyes were treated by SO.

SO removal was performed in nearly half of our patients which is comparable to other studies^{7,9}. Retinal re-detachment occurred in 2 (22.2%) out of 9 (47.36%) eyes undergoing SO removal. In other reports, corresponding rates have been 10%⁹. Considering the 18.4% chance of retinal re-detachment after SO removal in non-colobomatous eyes¹⁶, it might be concluded that a

presence of coloboma is not an additional risk factor for retinal re-detachment following SO removal.

Increased IOP was another common complication in our patients which occurred in 28.5% of vitrectomized eyes and was controlled with medications in most cases. SO emulsification has been considered as important risk factor for IOP rise. SO removal has been recommended 6-8 weeks postoperatively in such cases⁷.

The shortcoming of this study is that we were unable to compare vitrectomy with SB, and SO versus gas in the management of colobomatous RD. Based on this report and similar studies, vitrectomy with SO tamponade may be a good choice for management of colobomatous RD.

Despite an acceptable anatomical result, the functional outcome is rather poor which reflects involvement of vital structures in the eye as well as amblyopia. Ocular hypertension is a complication that deserves careful pre- and postoperative evaluation.

CONCLUSION

Pars plana vitrectomy along with silicon oil tamponade for retinal detachment related to choro-retinal coloboma improves the long-term anatomical outcome however no significant improvement in visual acuity was observed.

CONFLICT OF INTEREST

This study has no conflict of interest to declare

by any author.

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