Outcomes of Endoilluminator Assisted Scleral Buckle Surgery in Ispahani Islamia Eye Institute and Hospital

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Abstract

Aim: *To study the outcomes of patients with rhegmatogenous retinal detachment treated with endoilluminator assisted sclera buckle procedure in our hospital.*

Methodology: *This retrospective case series reviewed the records of 15 patients with rhegmatogenous retinal detachment who underwent endoilluminator assisted sclera buckle surgery.*

Results: *The mean age of the patients was 22.0 (SD 11.14) years. Primary retinal reattachment was achieved in 13 patients (86.7%) after one surgical procedure. One patient had perfluoropropane (C3F8) gas injection to augment the buckle while the other one underwent pars-plana vitrectomy due to proliferative vitreo-retinopathy (PVR). Final attachment was 100%. The mean best corrected visual acuity improved from logMAR of 1.54 (SD 0.51) to 1.00 (SD 0.51) which was statistically significant (P= 0.00), while the mean spherical equivalent changed from -0.95DS (SD 4.12) to -2.68DS (SD 4.15) Which was also statistically significant (P=0.003).Two patients experienced elevated intraocular pressure post operatively and were put on anti-glaucoma medication.*

Conclusion: *endoilluminator assisted sclera buckle surgery provides a promising modification to address the shortcomings of the traditional scleral buckle technique and provided the attendant risks are managed it could be acceptable to many retinal surgeons.*

Introduction

Rhegmatogenous retinal detachment (RRD) is one of the sight-threatening diseases(1). Scleral buckling (SB) and pars plana vitrectomy (PPV) are the two major surgical treatments for RRD(2). However, conventional scleral buckling using indirect ophthalmoscopy has several limitations, which surgeons endeavor to resolve through further modifications (3). It is inconvenient to observe the fundus due to the inverted and small fundus images. Further more, the surgical field cannot be easily shared with medical staff during the surgery, and thus the support provided by the surgical assistants may be limited(4)

In rhegmatogenous retinal detachment (RRD), one of the prognostic factors for poor surgical outcomes is the inability to detect retinal breaks (5). The use of a chandelier endoillumination improves visualization and treatment of the breaks during the procedure thus reducing surgical failure rates (6). Caution however should be taken due to the possible risks of surgical complications including vitreous wick from the scleral wound, endophthalmitis, lens damage, and light toxicity.

In this study, we assess the outcome of scleral buckling using BIOM combined with a 25-gauge light fiber as a fundus visualization system for the treatment of RRD.

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Subjects and Methods

We conducted a retrospective case series of 15 patients with RRD who underwent SB surgery using a combination of a noncon-tact wide-angle viewing system and a cannula-based 25 G chandelier endoilluminator for fundus visualization during surgery. Our study was approved by the insti-tutional review board of Ispahani Islamia Eye Institute and (IIEIH), and adhered to the tenets of the Helsinki Declaration. Included were sur-geries performed at IIEH from January 2017 to December 2017. All surgeries were performed by AHPK as he is the only one who uses the technique currently in the hospital.

The following information was recorded of each patient: Age, gender, duration of symptoms before presentation, duration of follow up, best corrected visual acuity at presentation and at last visits, primary and final anatomical attachment, lens status, number of retinal breaks, location of the break(s),quadrants involved by the detachment, status of the macular, whether sub-retinal fluid(SRF) was drained or not, the sclera buckle procedure done, pre and post operative refractive status, pre and post operative intraocular pressure(IOP), intra-operative and post operative complications and re-operations.

Data was entered and analyzed using SPSS V 20. Paired sample t-test was used to compare means of variables measured before and after the surgery and a P value of 0.05 or less was considered statistically significant.

The Surgical technique

4 surgeries were done under general anesthesia while the rest were under local anesthesia. All procedures were conducted using a surgical microscope. 360 degree conjunctival peritomy was done, the four rectus muscles were identified and a silk suture slinged under each muscle. Mattress sutures were placed on the sclera and 25G chandelier light was introduced at a specific position . Subretinal fluid drainage through the external sclerotomy was performed under the surgical microscope. Resight® was activated. The chandelier endoilluminator was placed into the cannula and turned on. Observations and cryoretinopexies of original reti-nal breaks by dynamic scleral compression with a cryoprobe were performed. For buckling procedure, silicone band (#240; MIRA Inc). After the confirmation of the buckle position and whether or not unexpected complication is present on the fun-dus under Resight® with the endoilluminator, the cannula was removed and the vitreous herniation from the sclerotomy site was checked and cut if necessary. Surgery was completed by closing the conjunctiva

Table I : *Demographic data for the patients and status of operated eye*

Characteristics	
No of eyes	15
Sex (n), men/women	10/5
Age (years), mean ± SD	22±11.14
Preoperative visual acuity (logMAR), mean ± SD	1.54±0.50
Visual acuity at the last visit (logMAR), mean ± SD	1.00±0.51
Spherical equivalent at presentation, mean ± SD	-0.95±4.12
Spherical equivalent at last visit, mean ± SD	-2.68±4.15
Follow-up period (days), mean ± SD	78.87±54.25
Initial anatomical success, n (%)	13 (86.7)
Final anatomical success, n (%)	15(100)
No of breaks, mean ± SD	1.33±0.72
Location of breaks, superior/inferior (n)	6/9
Quadrant of retinal detachment, 1/2/3/4 (n)	1/6/5/3
Macular detachment, macular on/macular off (n)	4/11

Note: Numbers in brackets are percentages.
Abbreviations: n, number; SD, standard deviation.

Results

Eye and patient characteristics

The study enrolled 15 eyes of 15 patients (5females, 10 males). The mean age of the patients was 22.0 (SD 11.14) years and ranged from 10 to 57 years. The duration from detachment to surgery ranged from 12 days to 7 months. The mean best corrected visual acuity (BCVA) at presentation ranged from hand movement to 0.8 logMAR while the mean spherical equivalent at presentation was -0.95DS (SD 4.12). All the eyes were phakic. The mean follow up period was 78.87 days (SD 54.25) and ranged from 9 days to 7 months. The retinal breaks were located in the inferior quadrants in 9 patients and superior quadrants in 6 patients. The mean number of retinal breaks was 1.33 (SD 0.72) and in 8 patients the detachment involved more than 2 quadrants while the rest had detachment in 1 or 2 quadrants. The macular was involved in 11 of the 15 patients. All the patients underwent 360 degree band buckle combined with cryotherapy and subretinal fluid drainage. All surgeries were done by APHK. Table 1below summarizes the patient characteristics.

Outcomes

Primary retinal reattachment was achieved in 13 patients (86.7%) after one surgical procedure. Of the 2 who didn't have primary attachment, one had partial detachment and had intra-vitreal perfluoropropane (C3F8) gas injection administered and face down position for 7 days recommended. Eventually the retina flattened. The other patient had failure due to PVR and had to undergo PPV with Silicon oil implantation. In this case too, the retina eventually attached.

The mean visual acuity improved from logMAR of 1.54 (SD 0.51) to 1.00 (SD 0.51) which was statistically significant (P= 0.00), while the spherical equivalent changed from -0.95 DS (SD 4.12) to -2.68 DS (SD 4.15) Which was also statistically significant (P=0.003).

Two patients experienced elevated intraocular pressure post operatively and were put on anti-glaucoma medication. At the time of writing both were still on anti-glaucoma medication having been diagnosed as steroid responders.

Discussion

Intraoperative retinal break identification and proper placement of the scleral buckle is critical to the success of Scleral buckle (SB) surgery. Indirect ophthalmoscopy gives an inverted image and handling needs experience. In addition, inspection of retinal defects may be hampered in patients with a small pupil and very small holes may be missed(7). Endoillumination combined with wide angle viewing system gives a wider field of view, an erect image and easier break identification. This theoretically improve outcomes of SB surgery as has been shown by various studies (4,8,9,7).

In our study primary anatomical attachment was achieved in 86.7% of the patients which is comparable to the rates found by Gogia et al(8) (95.67%); and by Xi-Juan Li(4) (94.27%). The latter also found a final attachment rate of 100% which is similar to what we found in our study. In our case, one patient needed augmentation of the buckle using C3F8 injection into the vitreous and his retina flattened after that combined with facedown positioning. The other patient had extensive PVR which hampered reattachment and had to undergo pars plana vitrectomy with silicon oil implantation. Eventually the retina was attached in this patient too.

We found that the mean visual acuity among our study population improved from logMAR of 1.54 (SD 0.51) to 1.00 (SD 0.51) which was statistically significant (P= 0.00). Gogia et al also found significant improvement in the mean visual acuity achieved at the end of their follow-up period (8). The refractive spherical equivalent in our study changed from -0.95 DS (SD 4.12) to -2.68 DS (SD 4.15) Which was also statistically significant (P=0.003). This compares with findings by William E Smiddy et al who found a myopic shift of 2.75DS for patients who underwent band buckle surgery(10).

Some of the intra-operative complications found included

Post operatively, intraocular pressure was found to be raised in 2 of our cases. Both were diagnosed with steroid response and put on anti-glaucoma medication. Pressure was controlled with the medication which the patients were still on at the time of writing. In the study by H. Imai et al(1), one eye developed secondary glaucoma for which trabeculectomy and ablation of the silicon band was done.

One of the limitations of our study is that it is retrospective without a control group. It therefore cannot asses the advantages of EASB over the traditional method conclusively. For this a large randomized controlled trial would be necessary. The other limitation is the short follow up period of our patients hence long term outcomes could not fully studied.

In conclusion, EASB provides a promising modification to address the shortcomings of the traditional SB technique and provided the attendant risks are managed it could be acceptable to retinal surgeons not only in Bangladesh but the world over.

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