Surgical and Visual Outcome Following Repair of Retinal Detachment with Giant Retinal Tear

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Abstract

Aim: To evaluate the surgical and visual outcome following repair of Retinal Detachment (RD) with Giant Retinal Tear (GRT)

Materials and methods: Eleven cases of RD with GRT were surgically managed between July 2007 and June 2008. Belt Buckling + Pars plana vitrectomy with endolaser + silicone oil injection was done in all cases; perfluoro carbon liquid was used to unroll the GRT. Mean follow up was 6 months following the final surgical procedure.

Results: All cases had oil removal after 4 months; retina remained attached after 3 months in 9, 1 case needed oil exchange, 1 needed reinjection of oil. 4 cases underwent cataract extraction with IOL along with oil removal. 9 cases had 6/36 or better vision; the causes of poor vision in the remaining 2 were epiretinal membrane and macular hole.

Conclusion: Surgical repair of RD with GRT gives good results, the cause of poor visual outcome is a macular pathology.

Introduction

Giant retinal tears (GRT) are retinal breaks that extent over 90 degrees or more in circumference. Progress in vitreoretinal surgical techniques during the past 25 years has greatly improved the anatomic and visual results after surgery for retinal detachment caused by giant retinal tears. Because of the difficulty of unfolding the retinal flap and keeping it attached, the prognosis was traditionally poor. In particular, the intraoperative use of perfluorocarbon liquids has greatly facilitated the manipulation of the retina and the preservation of the lens.

However, recurrent detachments caused by various factors (e.g., extension of preexisting tear, formation of new retinal tears and reopening of tear from proliferative vitreoretinopathy(PVR) still continue to be a challenge.

Encircling scleral buckling has been traditionally used to reduce the risk of such complications. The scleral buckle is thought to reduce early and late traction within the vitreous base, thus decreasing the risk of recurrent retinal detachment. Nevertheless, by inducing a distortion of shape of the eye, scleral buckle may enhance the risk of slippage of retina posteriorly. In addition, scleral buckling induces secondary axial lengthening.

Until now, successful repair of GRTs without scleral buckling has been described, but pre operative PVR has remained an indication for additional scleral buckling as part of repair.

Hoffman et al, for example, treated a small series of six eyes with preoperative photocoagulation of the attached peripheral retina from the ora serrata to the equator. They performed a vitrectomy, an intraoperative transcleral light cryotherapy to the choroidal bed of the tear and to the retina at the tear’s ends, and a C3 F8. Tamponade without placement of scleral buckle. The day after vitrectomy, photocoagulation was applied to the anterior flap of the GRT and the previously detached retina.

Materials and Methods

This study included eleven eyes of eleven patients with GRT operated at Little Flower Hospital Angamaly between July 2007 and June 2008. Nine were males and two were females with a mean age of 44years (range 15-68 yrs).

Pre operative assessment

The following preoperative clinical characteristics of patients were collected for statistical analysis: age, sex, preoperative trauma, the number of detached quadrants of retina, whether the central area of macula was involved in the detachment, and presence of proliferative vitreoretinopathy. Pre and post operative best corrected visual acuity was measured. Using slit lamp examination the following preoperative variables were noted: thee lens status, and whether the patient was phakic, pseudophakic, or aphakic. Fundoscopy was performed using binocular indirect ophthalmoscopy. Fundus drawings were made of the retinal detachment in clock hours.

Surgical technique

Scleral buckling (Belt buckling) was done in all eyes with a # 240 silicone band. A standard three port pars plana vitrectomy was performed. The vitreous was cut and aspirated meticulously. The infusion bottle height was lowered and perfluoro-n-octane was then injected slowly to produce a single bubble completely filling the vitreous cavity using a 20 gauge blunt or silicone tipped cannula, placed above the optic disc to unroll the folded retina. Endolaser was then applied around the tears and to the basal retina for 360° in all eyes. PFCL was not used in one eye in which only break was there and retina was not detached. Lensectomy was performed if the lens was subluxated. Then PFO was exchanged directly with silicone oil. Silicone oil 1000 centistokes was used for exchange. Retinal reattachment, recurrent retinal detachment, final visual outcome and complications were assessed.
Statistical analysis

Statistical analysis was performed using SPSS software. Snellen visual acuities were converted to a logarithmic scale (log MAR, i.e. the logarithm of the minimum angle of resolution). Comparisons between preoperative and postoperative visual acuities were made using the paired sample t test.

The upper temporal quadrant was involved in 9 patients, lower temporal quadrant in 7 patients, followed by upper nasal (5) and lower nasal quadrant (2). Retina was not detached in one patient.

Pre-operative vision was 6/24 or better only in 2 patients, whereas post-operatively 6 patients attained vision better than 6/24.

One patient who developed bullous keratopathy later underwent penetrating keratoplasty.

### Results

Eleven eyes of 11 patients were included; nine males and two females with age ranging from 15 to 68 (mean 44 yrs). Three eyes were highly myopic (≥ 6 D), three had history of trauma. 6 eyes were phakic, 2 were aphakic, 2 were pseudophakic with PC IOL, one had dislocated lens.

### Table 1 Patient Demography

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Myopia/ Trauma</th>
<th>Eye</th>
<th>Lens Status</th>
<th>Quadrant</th>
<th>BCVA</th>
<th>VA after SOR</th>
<th>Cat. Surgery with SOR</th>
<th>3 months after SOR</th>
<th>Resurgery</th>
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<tr>
<td>68</td>
<td>M</td>
<td>Trauma</td>
<td>RE</td>
<td>Aphakic</td>
<td>UTQ, UNQ</td>
<td>HM</td>
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<tr>
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<td>RE</td>
<td>Pseudophakic</td>
<td>UNQ, LNO, LTQ</td>
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<td>On</td>
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<td>UTQ, UNQ</td>
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1. Best corrected visual acuity 3 months (t test)

**P value and statistical significance:**
The two-tailed P value equals 0.0165
By conventional criteria; this difference is considered to be statistically significant.

**Confidence interval:**
The mean of pre op minus post op 3 months equals 0.6400
95% confidence interval of this difference: From 0.1298 to 1.1502

**Intermediate values used in calculations:**
t = 2.6166
df = 20
standard error of difference = 0.245

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<th>Group</th>
<th>pre op</th>
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<tr>
<td>SD</td>
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<td>0.4100</td>
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2. Best corrected visual acuity post silicone oil removal (t test)

**P value and statistical significance:**
The two-tailed P value equals 0.0016
By conventional criteria, this difference is considered to be very statistically significant.

**Confidence interval:**
The mean of pre op minus post SOR equals 0.9100
95% confidence interval of this difference: From 0.3900 to 1.4300

**Intermediate values used in calculations:**
t = 3.6504
df = 20
standard error of difference = 0.249

<table>
<thead>
<tr>
<th>Group</th>
<th>pre op</th>
<th>post SOR</th>
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**Discussion**
Our series of 11 patients is comparable to previously published series in terms of patient demographics (with the usual male predominance), and predisposing factors. In our study perfluorocarbon liquids were used which serve as useful intraoperative tool during vitreoretinal surgery to unfold the detached retina in GRT cases to provide counter traction and retinal stabilization during membrane peeling. In the one other published study reporting prognostic factors associated with visual acuity outcomes after management of giant retinal tears using intraoperative using perfluoroperhydrophenanthrene (Vitreon), the factors significantly associated with a poor visual outcome included hypotony, macular detachment, history of cataract extraction, poor preoperative visual acuity, giant retinal tear greater than 180 degrees, and a higher grade of proliferative vitreoretinopathy. In this study with PFCL a post operative vision of 6/36 or better was achieved in 82% patients. In 92% patients retina remained attached. In the study using Vitreon, all the eyes were followed up to 6 months. 91% of retina remained attached at final follow up, and 65% showed improvement in visual acuity.

**References**