

Giant Retinal Tears: Clinical Aspects and Surgery Outcomes

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I. Introduction:

A giant retinal tear (GRT) is defined as a full-thickness break in the retina equal to or larger than 3 clock hours associated with vitreous detachment. Risk factors for developing a GRT include trauma, high myopia, Marfan syndrome, Stickler's syndrome or other hereditary vitreoretinopathies, and extensive lattice degeneration.

Common techniques used to treat GRTs include fluid-air exchange, pneumatic retinopexy, scleral buckling, primary vitrectomy with gas or silicone oil tamponade, and combined scleral buckle-vitrectomy. Perfluorocarbon liquids (PFCLs) revolutionized the management of GRTs and the advent of small gauge vitrectomy techniques have further optimized the treatment outcomes.

The purpose of this study was to report clinical features and outcomes in patients with GRTs undergoing vitreoretinal surgery.

II. Patients And Methods:

A retrospective study was conducted in the ophthalmology department of 20 Aout 1953 teaching hospital of Casablanca. All patients diagnosed with GRTs who underwent vitreoretinal surgery between March 2014 and February 2019 were included. Data extracted were age, sex, duration of symptoms, extent of tear, types of surgery, lens status, PVR, status of the macula, anatomic outcome of surgery and pre and postoperative visits' best corrected visual acuity (BCVA). Visual acuities were measured with Snellen chart. All patients had to have at least 3 months of follow up. Data analysis was performed using SPSS software (version 15, SPSS Inc., Chicago, IL, USA).

III. Results:

The study included 31 eyes of 31 patients with a presentation of retinal detachment with a GRT. The study included 20 (64.52%) male subjects. The mean age at initial presentation was 34 ± 12.3 years. The mean follow-up interval was 13.2 ± 9 months. Right eyes were involved in 17 cases (54.84%) Principal associations for the development of GRTs included prior history of blunt trauma (12.90%), high myopia ≥ 6 diopters (41.94%) and pseudophakia (22.58%). Less common associations of GRTs included Marfan syndrome (6.45%).

The mean size of the GRT was $111.40^\circ \pm 23.90^\circ$. The majority (61.3% of eyes) of the GRTs were superior and inferior. Rolled edges were seen in 41.9% of the cases. The associated RD was macular involving in 87.1% of the cases. 45.2% of patients presented with grade C vitreoretinal proliferation. The majority of eyes (76%) were initially phakic, while 22.58% were pseudophakic, and 6.45% were aphakic.

Management approach for repair of GRT-associated retinal detachments included scleral buckle (SB) alone (3 eyes) in cases of inferior GRTs without rolled edges, pars plana vitrectomy (PPV) (25 eyes), and combined SB/PPV (3 eyes). Silicon oil was used in 18 cases and perfluoropropane (C_3F_8) in 13 cases. Perfluorocarbon liquid was used equally (and frequently) in GRTs involving both $< 180^\circ$ and $\geq 180^\circ$. Silicone oil was more frequently used as tamponade in eyes with GRTs $\geq 180^\circ$ compared with). In cases of PPV, endolaser was applied in a confluent fashion for one or two rows posterior to the GRT in 20 cases and cryopexy in 8 cases. 360° endolaser cerclage was performed in 5 cases. In the 3 cases with SB only, cryopexy was used.

Preoperative visual acuity was $\geq 1/10$ in 12.90% cases. At 6 months, 38.80% of cases had BCVA $\geq 1/10$. The retina was reattached at the last recorded follow-up examination in 26/31 eyes. The silicone oil had been removed in 8 eyes with silicone oil tamponade at last follow-up. Retinal redetachment occurred in 2 eyes after silicone oil was removed, with all detachments occurring an average of 3 months after initial

repair. Recurrent RD after the primary repair occurred in 5/31 eyes. The lack of endolaser cerclage, surgical management delay and advanced vitreoretinal proliferation were associated with a higher risk of retinal redetachment.

IV. Discussion:

The management of GRT-associated RDs has been substantially more successful with modern surgical techniques. Surgical outcomes for RDs associated with GRTs have improved during the past 20 years(1–5) The historic reattachment rate has been as low as 11%, whereas the rates of single surgery reattachment and final reattachment rates in recently published studies reflect the value of the vitreoretinal tools now available. Perfluorocarbon liquids seem to have offered the most benefit in this improvement, but outcomes have also improved concurrent with the inception of wide-field viewing systems, high-speed cutters, and small gauge vitrectomy.

Ghasemi Falavarjani et al. found a high anatomical reattachment rate of 72.5% after first surgery with a final success rate of 98.4%(6). A history of blunt trauma was found in 29% of eyes. Previous studies have also reported a similar rate of trauma (10–40%).. Similarly, the rate of high myopia in this study (21%) was within the range of previous reports (12–47%)(7, 8).

There are still a variety of surgical technique variations advocated, but there is virtual unanimity that PPV and perfluorocarbon liquids are preferred management components(9). Rodriguez et al. documented perfluorocarbon liquid use in 78% of cases, regardless of GRT extent, contrasting with earlier studies using it more frequently in larger GRTs (statistical significance not reported)(2) This current series also found that reoperations did not differ regardless of GRT size. Although the extent of the GRT may impact the technical difficulty of the surgery, it did not seem to determine surgical management or anatomic success.

Silicone oil was most commonly used for internal tamponade and had a high anatomic success rate similar to that of C₃F₈. In one report with the predominant use of silicone oil rather than gas, the superiority of silicone oil tamponade could not be confirmed.(10) While it is uncommon to use SF₆, studies have associated SF₆ with a lower success rate(11).

Scleral buckling in GRT surgery has been controversial, as there is a general tendency away from SB use in current RD repair approaches. Scleral indentation from a buckle can distort the shape of the globe and might potentially increase the risk of GRT slippage. On the contrary, an encircling buckle may provide vitreous base support and, particularly in the case of anterior PVR, may reduce the risk of redetachment by preemptively neutralizing subsequent traction. Goezinne et al compared the addition of SB procedure with PPV in patients undergoing retinal reattachment surgery for GRTs and found that the presence of an encircling SB was a positive predictive factor for retinal reattachment.(12) In contrast, other retrospective studies found that the rate of redetachment was similar in the cases of PPV alone compared with a combined PPV/SB approach (5,11) In a 2018 reported series regarding the use of 25-gauge vitrectomy for GRT, neither the extent of GRT nor the use of scleral buckling influenced anatomic or visual outcomes(10)

V. Conclusion:

GRTs are still managed with variable surgical techniques even within the same practice. No techniques have been established objectively, but there is a consensus on the use of perfluorocarbon liquids, while many other maneuvers are clinical impressions gleaned from individual surgeons experiences. The current series affirms the high success rates that accompany a high prevalence of initial PPV and either silicone oil or C₃F₈ that seem to have yielded reasonable results consistent with contemporary reports and experience

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