Giant retinal tears treated with lens sparing, bimanual 23 g vitrectomy without scleral buckle

ABSTRACT

Background: Giant retinal tear is defined as a full thickness break in the neurosensory retina that extends circumferentially for 3 or more clock hours around the retina in the presence of a posterior vitreous detachment. It is one of the more complex surgical scenarios that a retina surgeon can face. There is no consensus on the ideal surgical technique; however, the “traditional” approach has been to perform a combined procedure including lensectomy, scleral buckle and vitrectomy. We report the outcome over 2 years of five patients with giant retinal tears managed with lens-sparing, bimanual 23-gauge vitrectomy without scleral buckle.

Methods: We carried out a retrospective analysis of patients with giant retinal tears managed with lens-sparing, bimanual 23-gauge vitrectomy without scleral buckle. Included in the analysis were age, lens status, etiology and size of the tear, pre- and postoperative visual acuity, anatomic success, tamponade used, and laser or cryopexy where recorded.

Results: Three patients were included in the analysis. One had high myopia, one secondary to blunt trauma and one with Wagner-Stickler syndrome. The size of the tear varied from 120-280°. Anatomic success was achieved in all patients. One patient developed proliferative vitreoretinopathy and was re-operated and the retina remained attached.

Conclusions: In this group of selected patients, lens-sparing bimanual 23-gauge vitrectomy without scleral buckle seems a safe and effective option in the management of retinal detachment associated with giant retinal tears. Further prospective and comparative studies are warranted to establish the role of this technique in the treatment of patients with this complex pathology.

Key words: Retinal detachment, giant retinal tear, scleral buckle, vitrectomy.

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BACKGROUND

Among the complicated retinal detachments, without a doubt the one associated with a giant tear is one of the greatest surgical challenges for the surgeon. Its low incidence (0.07 to 0.5% of the rhegmatogenous retinal detachments) is the reason that it is not often found in clinical practice and in the large centers of reference. Giant retinal detachments are defined as a circumferential retinal tears > 90 degrees in extension (3 clock hours) where the vitreous attaches to the anterior margin of the flap, which provides it with a posterior margin that is tear free and with independent mobility (Figure 1). Due to the effect of gravity this mobile edge is inverted towards the optic disc, and this causes the procedure to require multiple surgical maneuvers and special equipment to “unfold” the retina.2

Giant tears are more common in myopic patients and in males. According to its etiology, 70% are idiopathic, 20% traumatic and in 10% of the cases they occur in the posterior margin of a chorioretinal degeneration.3,4 Treatment of giant retinal tears is, without a doubt, one of the most challenging surgical maneuvers for the vitreoretinal surgeon. Different surgical techniques with various instruments have been used for its treatment that are useful for unfolding the flap, surgical beds designed to operate patients face down and intraocular inflated pneumatic balloons. Intraocular “tacks” or “nails” are used to secure the edges of the tear whose biggest drawback is their frequent migration, sometimes reaching the macula. The purpose of all these maneuvers is to achieve a better result in patients affected with this challenging disease that in the past had a somber prognosis. The turning point of these developments was the introduction of heavy liquids, which are often a “third instrument” that helps to stabilize the retina and unfold the flap and have even been used as a means of tamponade.5-8 Despite all the advances, the most important postoperative complication in these patients continues to be recurrent detachment that occurs in 30 to 50% of cases, especially due to proliferative vitreoretinopathy.8

The current surgical approach in the majority of the cases consists of placement of a scleral buckle, removal of the lens, and placement of silicon oil as a tamponade in addition to a vitrectomy as “complete” as possible, shaving the vitreal base; however, use of placement of a buckle, removal or not of the lens and use of tamponade are currently controversial. Many of those affected by giant tears are young patients with clear lens that allows adequate visualization of the posterior pole, therefore, removal of the lens in these patients poses a dilemma for the surgeons when there is no anterior proliferative vitreoretinopathy. Likewise, scleral buckle is neither harmless nor free of complications, among which is the increase of axial length (making the patient myopic), infection of the explant, formation of retinal folds in the posterior pole, “fish mouths” at the edges of the tear, choroid detachment, and intrusion or extrusion of the flap...
Giant retinal tears without scleral buckle

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Explant, among others. Use of the buckle is not necessarily a negative because it relaxes the vitreal base and decreases the tractional forces. It is believed that it could decrease the incidence of recurrent retinal detachments associated with giant tears.

There are some reports of treatment of giant tears without scleral buckle and lens preservation with good results. For this reason we decided to report a series of cases operated in our institution in which a bimanual approach was used, preserving the lens and without placement of a scleral buckle. The objective of this article is to report the 2-year follow-up results of a series of patients with retinal detachment associated with a giant tear and who were treated with bimanual 23-gauge vitrectomy without placement of a scleral buckle and without affecting the lens.

METHODS

We carried out a descriptive, retrospective follow-up study of a series of cases of patients with giant retinal tears treated with bimanual 23-gauge vitrectomy without affecting the lens and without placement of a scleral buckle. Clinical records of patients with retinal detachment associated with a giant retinal tear seen between January 2007 and January 2009 were reviewed. All surgeries were performed by the same surgeon.

Inclusion criteria were retinal detachment associated with a giant tear and evolution <30 days without regard to etiology, clear lens and treatment with bimanual 23-gauge vitrectomy (without placement of a scleral buckle and lens preservation). Exclusion criteria were any degree of cataract or anterior proliferative vitreoretinopathy, placement of a scleral buckle or lensectomy.

Variables studied were age, lens status, etiology and extent of the tear, pre- and postoperative visual acuity, application of cryotherapy or laser as method of retinopexy, tamponade used, and anatomic result. Visual acuity was evaluated with a Snellen chart and was converted to the LogMAR scale. Visual acuity results were compared with the paired Student t test and \( \alpha = 0.05 \).

All patients underwent a three-port 23-gauge vitrectomy and an auxiliary light was placed through a 25-gauge port for bimanual surgery. A central vitrectomy was done and subsequently the vitreal base was shaved. The same surgeon performed scleral depression so that the shaving would be adequate without touching the lens. Subsequently, the heavy liquids were placed, which repositioned the folded retina. Once the retina was found to be attached, cryotherapy or laser was applied as a method of retinopexy. Finally, gas was applied as a mechanism of tamponade.

RESULTS

During the study period, five patients with retinal detachment associated with giant tears were treated with 23-gauge bimanual vitrectomy without scleral buckle and without touching the lens. Three males and two females were treated. Ages ranged from 24 to 38 years. Follow-up period in all patients was 2 years. The etiology of the tear was idiopathic associated with high myopia in three patients, secondary to trauma in one patient and secondary to chorioretinal degeneration associated with Wagner-Stickler syndrome in one patient. The extent of the tear varied from 120 to 280° and in all cases gas was used as a tamponade (Table 1).

The five patients were treated in the first 30 days after symptom onset. All were operated with a laser-applied 23-gauge vitrectomy. Only one patient had cryoretinopexy done. There were no intraoperative complications. Table 2 notes the associated diagnoses, the gauge used and the visual results at 2-year follow-up. It is observed in Figure 2 that visual acuity remained without changes in one patient,
another had a discrete improvement and in three patients a statistically significant improvement in vision was recorded ($p=0.02$).

One patient with Wagner-Stickler syndrome had recurrent detachment 3 months after the initial surgery. On that occasion, the patient’s condition was complicated by proliferative vitreoretinopathy and the patient was re-operated with a 20-gauge vitrectomy with 5000 cS silicon oil placed as tamponade in the vitreous cavity and reattachment of the retina was achieved.

**DISCUSSION**

Numerous techniques have been described for treatment of giant retinal tears. Up to now there is no evidence or consensus among retinal surgeons as to what is the best method of approach. Many techniques include lens extraction to allow “better visualization” and shaving of the vitreal base,\(^5\) arguing also that there is a possibility that during vitrectomy there be contact with the lens and then later on a cataract; however, although common, a careful technique can avoid or at least delay the appearance of a cataract after vitrectomy. There are reports of successful treatment of retinal detachment associated with a giant tear without removing the lens.\(^6\)

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**Table 1.** Preoperative characteristics and postoperative 2-year results

<table>
<thead>
<tr>
<th>Patient</th>
<th>Associated diagnosis</th>
<th>Extension of the tear</th>
<th>Actual status of the retina</th>
<th>Taponade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High myopia</td>
<td>270°</td>
<td>Applied</td>
<td>Gas*</td>
</tr>
<tr>
<td>2</td>
<td>High myopia</td>
<td>180°</td>
<td>Applied</td>
<td>Gas*</td>
</tr>
<tr>
<td>3</td>
<td>High myopia</td>
<td>120°</td>
<td>Applied</td>
<td>Gas*</td>
</tr>
<tr>
<td>4</td>
<td>Trauma (contusion)</td>
<td>180°</td>
<td>Applied</td>
<td>Gas*</td>
</tr>
<tr>
<td>5</td>
<td>Wagner-Stickler</td>
<td>280°</td>
<td>Applied with silicon</td>
<td>Gas*/Silicon**</td>
</tr>
</tbody>
</table>

*Gas utilized was C3F8 in all cases.
**During the second surgery, 5000 cS silicon oil was placed as tamponade.

**Table 2.** Pre- and postoperative diagnosis and visual acuity.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Diagnosis</th>
<th>Caliber</th>
<th>VA Preop</th>
<th>LogMAR Preop</th>
<th>VA Postop</th>
<th>LogMAR Postop</th>
<th>AVA at 2 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High myopia</td>
<td>23k</td>
<td>CF</td>
<td>2.00</td>
<td>20/100</td>
<td>0.70</td>
<td>20/80</td>
</tr>
<tr>
<td>2</td>
<td>High myopia</td>
<td>23</td>
<td>CF</td>
<td>2.00</td>
<td>20/200</td>
<td>1.00</td>
<td>20/200</td>
</tr>
<tr>
<td>3</td>
<td>High myopia</td>
<td>23</td>
<td>CF</td>
<td>2.00</td>
<td>20/40</td>
<td>0.30</td>
<td>20/25</td>
</tr>
<tr>
<td>4</td>
<td>Contusion trauma</td>
<td>23/20</td>
<td>20/60</td>
<td>0.50</td>
<td>20/30</td>
<td>0.20</td>
<td>20/30</td>
</tr>
<tr>
<td>5</td>
<td>Wagner-Stickler</td>
<td>23/20</td>
<td>CF</td>
<td>2.00</td>
<td>CF</td>
<td>2.00</td>
<td>CF</td>
</tr>
</tbody>
</table>

*VA, visual acuity (best corrected); CF, counting fingers; Preop, preoperative; Postop, postoperative.

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**Figure 2.** Pre- and postsurgical visual acuity. $p=0.02$. 
Scleral buckle reduces traction of the remaining vitreous and appears to prevent recurrent detachment. In various studies, absence of a scleral buckle was associated with a risk factor for recurrent detachment.\textsuperscript{1,5} However, in the majority of these studies there was some degree of pre-existing proliferative vitreoretinopathy, which skewed the results to a better evolution in patients with buckle, where on the face of proliferative vitreoretinopathy it is imperative that it be placed. At the same time, favorable results have been reported without scleral buckle.\textsuperscript{5,7,9}

In our series, we were able to observe favorable long-term anatomic and functional results in this group of patients in whom the lens was not touched or was scleral buckle placed. Table 1 demonstrates how the visual acuity of all patients, except the patient with Wagner-Stickler syndrome, improved. At 2 years of follow-up, visual acuity remained stable in all patients. In fact, one patient reached 20/25 final visual acuity.

The patient with Wagner-Stickler syndrome had recurrence of detachment 3 months after the initial surgery. The patient was intervened with a 20-gauge vitrectomy and had 5000 cS of silicon oil placed as tamponade. This achieved attachment of the retina. This patient had two unfavorable conditions from the preoperative period: collagen disease of the syndrome itself and the large topographic extent, which resulted in greater exposure of the pigmented epithelium of the retina, favoring formation of a proliferative vitreoretinopathy and with it recurrent detachment.\textsuperscript{11} Because there were no points of residual traction at the end of the surgery, it was decided to place gas on all patients (C3F8) as tamponade and in accordance with the increased surface tension of the gas on the silicon. The associated benefit was that the need for a second surgical procedure to remove the silicone was avoided,\textsuperscript{12} an advantage that was lost on our patient with Wagner-Stickler syndrome. Even so, re-operation in the period analyzed is not as high as that reported in other series.\textsuperscript{13}

Without a doubt, the great technological advances in the field of vitreoretinal surgery have led to less invasive, improved surgical procedures that have resulted in better outcomes for our patients. Technological advances shown for vitrectomy equipment provide different advantages: better control of intraocular pressure and greater stability of the posterior chamber. New devices such as small calibers\textsuperscript{14} with greater rigidity and better design (closer placement to the point of the mouth of the vitrector) have better movement and greater cutting velocity that allow greater stability which, combined with accessory illumination, make for a safer and more comprehensive surgery (less risk of intraoperative complications).\textsuperscript{15-17}

The advantages of the technique used in our study are shorter surgical time and less trauma because there is only one intervention (vitrectomy) and, unlike the traditional approach (lensectomy + vitrectomy + scleral buckle), the refractive state of the patient remains unchanged and the accommodation is preserved.

Other advantages are that it prevents complications associated with lensectomy and placement of a buckle, such as explant infection, among others. The retrospective nature of the study and the number of patients included represent limitations of our study; however, the follow-up in this cohort enables the observation of good long-term results using this technique. It is necessary to carry out prospective, multicenter studies with a control group and traditional approach in order to be able to compare both techniques and to determine the actual role that the approach proposed here has in the treatment of this complex pathology.

In conclusion, in a 2-year follow-up of the group of patients of this study, the bimanual 23-gauge vitrectomy without scleral buckle and without touching the lens showed good anatomic and visual results. To establish the role that cor-
responds to this technique in the treatment of giant retinal tears, prospective and comparative studies are required.

**REFERENCES**


