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Peritomy-sparing scleral buckle

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ABSTRAC

Purpose: To introduce a modified technique for encircling circumferential scleral buckling without peritomy thorough a small conjunctival opening for the repair of uncomplicated rhegmatogenous retinal detachment (RD).

Methods: This technique was performed in 10 eyes of 10 patients with primary rhegmatogenous RD who underwent encircling circumferential scleral buckling without peritomy. Transconjunctival traction sutures were placed in four rectus muscles. After transconjunctival location of the retinal break, a 5- to 6-mm radial conjunctival incision was performed in 4 quadrants without cutting the limbal conjunctiva–Tenon's capsule. A 240-silicone band in scleral belt loops was used for an encircling circumferential buckle. After drainage and cryopexy, SF6 was used for tamponade. The incision was closed via layered closure only ocassionally.

Results: Primary attachment success of 100% was achieved by single procedure. The intraoperative and postoperative complications observed included subconjunctival hemorrhage observed in 5 (50%) of eyes. These disappeared in the postoperative period.

Conclusions: Minimal conjunctival incision in scleral buckle without peritomy can achieve excellent anatomical success in patients with rhegmatogenous RD without distorting ocular surface anatomy. This is the first description of technique preserving corneal limbus anatomy that could convert buckling surgery to more attractive option for retina surgeons.

1. Introduction

In 1949, Custodis introduced the scleral buckling procedure (SB) for the primary repair of rhegmatogenous retinal detachments (RRD). Numerous studies have reported the indications, techniques, complications, and outcomes for the SB procedure.[1,2] In the 1970s with the advancement of pars plana vitrectomy, an alternative approach to retinal detachment surgery was introduced.[3] Although vitrectomy is being more commonly used to repair rhegmatogenous retinal detachments, scleral buckling has been the standard surgical technique for many years. For scleral buckling, the conjunctiva is usually opened by a limbal peritomy.[4–7]

Conventional peritomy, originating from an early surgical procedure involves coagulation of the detached area. It has the disadvantage of inducing scarring of conjunctiva–Tenon's capsule and/or the sclera and may therefore hinder potential future surgical procedures such as revision of buckling implant, pars plana vitrectomy, and glaucoma surgery.[8,9] Peritomy also requires a large incision and extensive dissection that can induce problems, for example, hemorrhage and cosmetic distress especially during the early postoperative period,[5] discomfort because of sutures at limbus,[6] and extensive scarring of the conjunctiva–Tenon capsule and the sclera.[4,6]

In addition, trabeculectomy has a particularly high failure rate in eyes with scleral buckles because significant conjunctival scarring does not allow bleb survival.[10] Therefore, ocular surface sparing approach would be a useful addition to surgical buckling armamentarium. Here, we describe a modification of a traditional scleral bucking through a small conjunctival radial incision between muscles in four quadrants avoiding peritomy with minimal surgical trauma to the anterior conjunctiva–Tenon's capsule and extraocular muscles.

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2. Materials and methods

2.1. Patients

This is a consecutive case series study during January 2014 and 2016. Patients signed informed consent before the procedure where details of surgery were explained. The study adhered to the tenets of the Declaration of Helsinki and was approved by Ethics Committee of the Clinical de Ojos, Maracaibo, Venezuela. Inclusion criteria included uncomplicated primary rhegmatogenous retinal detachment with no posterior vitreous separation. Excluded from this technique were eyes with retinal dialysis, breaks posterior to the equator, complex retinal detachments with proliferative vitreoretinopathy (PVR). Patients with high myopia and a history of some pathology or surgery that could compromise the sclera were also excluded.

2.2. Surgical technique

A preoperative mapping of the fundus to locate the retinal breaks using a binocular indirect ophthalmoscope and a three-mirror contact lens was performed. All surgical procedures were performed under retrobulbar anesthesia. Rectus muscles were lifted with a rectus superior forceps allowing placement of transconjunctival traction sutures (Silk 4.0) under the four rectus muscles. The retinal break was localized transconjunctivally by indirect ophthalmoscopy and marked by a depression mark. Without a conjunctival peritomy, radial conjunctival incisions (5–6 mm) between extraocular muscles with exposure of the sclera and a partial thickness scleral “belt-loop” tunnels in the 4 quadrants were performed with a crescent knife (Fig. 1). Traction suture used to lift the muscle to pass a 240-silicone band used for an encircling beneath each rectus muscle from one incision to the next quadrant incision assisted by a dressing forceps (Fig. 2). The band was connected by silicone sleeve. A thin needle fluid drainage was performed in the area of highest subretinal fluid accumulation previously identified with indirect ophthalmoscopy without suturing. Cryopexy was performed. Endotamponade with SF6 intraocular gas was used in all cases. Anterior chamber tap with 30-G needle was used if intraocular pressure was high. The incision was closed via layered closure only occasionally, upon surgeon's discretion. Fig. 3 shows an example of immediate post-operative finding. (Please see video).

Supplementary video related to this article can be found at https://doi.org/10.1016/j.ajoc.2019.100474

3. Results

A total of 10 eyes of 10 patients were included in this study. There were 4 females and 6 males and the age ranged from 21 to 65 years of age. Mean preoperative visual acuity was 1.7 LogMAR. The most common configuration was macula-off inferior RRD in 6 eyes, and the most common retinal break was a tear (7 eyes) - 2 eyes in consecutive quadrant and 1 eye with 3 tears in the same quadrant. Median follow-up was 8 months (6–12 months). Surgery was uneventful in all cases. In the follow-up period, we used cotton-tipped applicator to show that the conjunctiva was mobile in all eyes. Primary attachment success of 100% was achieved by single procedure and no complications were observed during the follow up period. The mean final visual acuity achieved was 0.84 LogMAR – significantly better than baseline ($p < 0.05$). The intraoperative and postoperative complications included subconjunctival hemorrhage in 5 (50%) of eyes. These disappeared in the postoperative period on topical treatment. Buckle infection, a serious postoperative complication, has not been observed either during follow-up. There was no post-operative strabismus in any of the eyes.

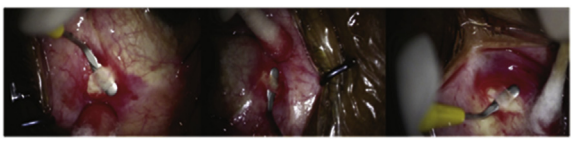

Fig. 1. Intraoperative image demonstrates partial thickness scleral tunnels.

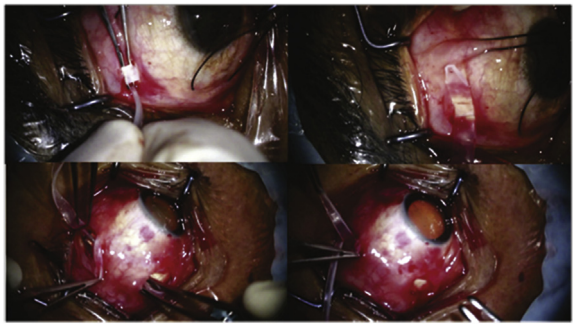

Fig. 2. Intraoperative image demonstrates passing the buckle beneath the muscle from one incision to the next scleral tunnel incision.

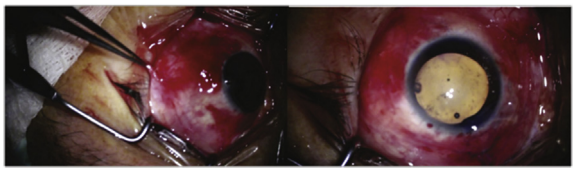

Fig. 3. Intraoperative image demonstrates the final view of minimally invasive scleral buckle.

4. Discussion

In this pilot case series of eyes with primary uncomplicated rhegmatogenous RD treated with minimal conjunctival/peritomy sparing, retinal reattachment with single surgery was achieved in 100% of eyes. The case selection followed standard surgical practices for scleral buckling indications and excluded the eyes with detachments where vitrectomy surgery is preferred. The described procedure is feasible to perform. The reported complications with peritomy-based scleral buckling such as scleral and conjunctival/limbal scarring were absent as assessed by clinical examination.

The use of a radial incision used in presented technique has advantages over a limbal peritomy as it reduces the amount of dissection required. Postoperatively patients reported less change in corneal and conjunctival sensitivity and stability of tear film but this was not quantified. Previously, corneal sensitivity has been reported to be decreased after diathermy encircling procedures.[11] Radial conjunctival incision also reduces bleeding, leads to faster cosmetic recovery, and facilitates possible future glaucoma surgery.[12] Stem cells for the cornea reside at the corneoscleral limbus and this microenvironment is considered to be important in maintaining the stemness of stem cells.[13] The present technique can reduce the risks leading to injuries in this area.

Peritomy sparing scleral buckling minimizes the risk of inadvertent penetration of the globe, when passing sutures. The instrumetarium for this modified technique is very basic. We believe that peritomy-sparing technique can be employed to treat most primary rhegmatogenous retinal detachments. The sutureless technique also has the advantage of avoiding unnecessarily high and/or irregular buckle, which often can occur when employing sutures.[14] Disadvantages of technique include limited field of view, blind passage of silicone band under extraocular muscles and a need for an assistant to help retract the tissue.

The limitations of our report includes small number of patients, lack of control group and relatively short follow-up period. The efficacy of this technique would require prospective validation, and perhaps head to head comparison between this modified technique with already

established buckling techniques of repairing RRD. This is, however, the first description of this technique preserving corneal limbus anatomy that could convert buckling surgery to more attractive option for retina surgeons.

5. Conclusions

Minimal conjunctival incision in scleral buckle without peritomy can achieve excellent anatomical success in patients with rhegmatogenous RD without distorting ocular surface anatomy.

Patient consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

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Conflicts of interest

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Authorship

"All authors attest that they meet the current ICMJE criteria for Authorship".

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ajoc.2019.100474.

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