

Case Report

Forced Duction Test: Is It Necessary after the Scleral Buckling Procedure?

Mohammad Sharifi · Mohammad Reza Ansari Astaneh

Eye Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

Keywords

Forced duction test · Strabismus · Scleral buckling

Abstract

A 14-year-old boy who had ocular motility disorder which started 2 weeks following retinal surgery (scleral buckling) secondary to rhegmatogenous retinal detachment, was referred to the strabismus clinic. He had significant ocular movement limitations in adduction and elevation under general anesthesia. The forced duction test (FDT) was positive in both adduction and elevation. After buckle removal, FDT was negative. The eye was orthotropic without ocular movement limitation at final follow-up. In conclusion, FDT at the end of the scleral buckling procedure needs to be performed. It may prevent restrictive strabismus after scleral buckling surgery.

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Introduction

Strabismus following retinal detachment surgery has been reported in up to 50% of patients. In 5–25% of cases, it usually resolves spontaneously within 3–6 months [1], although it can persist in approximately 3.6–25% of cases [2]. This kind of strabismus may have multiple mechanisms such as sensory causes [3], periocular anesthesia toxicity [4], or mechanical factors related to scleral buckle implantation. These mechanical factors may arise secondary to direct muscle injury [5], adhesions between muscle and sclera, fat prolapse [6], size of

scleral buckle or redirection of muscle forces either directly or indirectly by the buckle [7]. This kind of adhesion can manifest as incomitant deviation with horizontal, vertical, or torsional components [8]. The success rate of strabismus surgery after scleral buckle ranges from 47 to 80% compared to 60–80% in congenital strabismus [8]. Here, we present a patient who complained of strabismus immediately after retinal buckle surgery.

Case Report

A 14-year-old boy was referred to the strabismus clinic due to ocular movement disorder after retinal surgery. He had a history of macula-on rhegmatogenous retinal detachment with a large superior break in the left eye 2 weeks before admission. He underwent a scleral buckling procedure consisting of sponge 507/200, cryopexy, and air injection with successful anatomical attachment.

On ophthalmic examination, the best corrected visual acuity of the left eye was 20/40. Relative afferent pupillary defect was negative. Gross and biomicroscopic evaluation showed lid swelling and conjunctival hemorrhage. Funduscopic evaluation showed a good buckle effect, completely attached retina, and a small air bubble in the vitreous cavity. Ocular motility exam revealed large-angle exotropia (90 Prism dpt) in primary position and severe limitation in adduction and elevation and to some extent in depression (Fig. 1).

The globe could not pass the midline; therefore, the patient was considered as a candidate for strabismus surgery under general anesthesia. The forced duction test (FDT) was positive on both adduction and elevation. Conjunctival sutures were removed, and medial, superior, and lateral rectus muscles were hooked. Exposure revealed a large-size sponge beneath the three rectus muscles. Its fixations were released, and sponge was removed. FDT was performed again, and it was negative. Conjunctiva was sutured with vicryl 8-0 (Ethicone), and the eye was patched.

The patient was orthotropic in the primary position and had a nearly full range of ocular movement postoperatively (Fig. 2). His retina was attached completely at 1 month after surgery without any further intervention.

Discussion

Several factors are associated with strabismus after scleral buckling procedures. They are operative trauma, fat adhesion syndrome, and mismatch between size of the buckle and globe. Sometimes, strabismus can present before retinal detachment. Borderline fusion may be disrupted in several ways like blurring of vision due to retinal detachment, ocular occlusion after surgery, or haziness of ocular media [9].

Operative trauma is a cause of ocular motility disorder after scleral buckle procedures, so minimizing operative trauma by careful and gentle surgical technique has been stressed repeatedly [9].

Disinsertion of rectus muscle can cause strabismus after scleral buckle procedures [9]. Also size, type, and location of buckle can influence ocular movement [10, 11]. Sometimes, a mismatch between size of buckle and globe can cause mechanical restriction. In such cases, diplopia and limitation in ocular movements occur soon after surgery. FDT at the time of surgery after buckle insertion may reveal mechanical limitation of extraocular muscles and lead

the surgeon to revise the buckle at the time of scleral buckle procedure and avoid such strabismus.

In conclusion, strabismus after scleral buckle procedures is multifactorial. Meticulous surgical techniques and FDT at the end of the scleral buckling procedure may avoid acute-onset diplopia, ocular movement disturbances, and second surgeries for buckle revision.

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Statement of Ethics

This manuscript was approved by the Ethics Committee of Mashhad University of Medical Sciences. The subject has given his written informed consent.

Disclosure Statement

No conflict of interest.

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Author Contributions

Data collection, writing, and submission of the manuscript was done by Dr. Sharifi, and Dr. Ansari Astaneh. We approve the final version of the manuscript.

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Fig. 1. The different gazes of the patient before surgery for buckle removal. Top: up gaze. Left: right gaze. Centre: primary position. Right: left gaze. Down: down gaze.



Fig. 2. The different gazes of the patient after scleral buckle removal. Top: primary position. Left: right gaze. Centre: up gaze. Right: left gaze.