INTRACTABLE PAIN AND DIPLOPIA AFTER SCLERAL BUCKLE SURGERY

Hossein Nazari, MD, PhD,* Geoffrey Emerson, MD, PhD,† Peter H. Tang, MD, PhD†

Purpose: To report a case of early postoperative scleral buckle slippage because of the dehiscence of scleral belt loop tunnels.

Method: Case report.

Results: A 54-year-old woman presented with painful diplopia after a combination pars plana vitrectomy and scleral buckling procedure. Ocular movements were limited. Forced duction testing was restricted in all directions. Anterior slippage of the silicone band was suggested on computed tomography (CT) scans and was confirmed with surgical exploration. During surgery, it was found that thin-roofed scleral belt loop tunnels were dehisced in three quadrants leading to anterior slippage of the buckle. The displaced buckle was removed. Diplopia and pain resolved, and ocular motility improved immediately afterward. The retina remained attached at six months follow-up. A supplemental video summarizes the surgical findings and postoperative results.

Conclusion: Spontaneous dehiscence of scleral belt loops may occur in thinly dissected scleral tunnels. Painful eye movement, diplopia, and a positive forced duction test should raise suspicion about a displaced scleral buckle. A CT scan may help with the diagnosis. Early diagnosis and immediate surgical intervention are needed to minimize patient discomfort and to improve long-term ocular motility.

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From the *Department of Ophthalmology and Visual Neuroscience, University of Minnesota, Minneapolis, Minnesota; and †Retina Consultants of Minnesota, Minneapolis, Minnesota.

Scleral buckling is an effective surgical treatment for rhegmatogenous retinal detachment.1 The buckle can be composed of various materials, and numerous techniques exist for placement; however, all the iterations of this surgery include creating an adhesion around the retinal breaks and securing an episcleral explant that indents the sclera. This relieves the vitreoretinal traction over peripheral retinal pathologies and closes retinal breaks. Two main approaches for this surgery are: 1) segmental scleral buckle (SB) i.e., placed only over the peripheral retinal pathology and 2) encircling SB that requires securing an element to the scleral surface in all four quadrants, traditionally using mattress sutures. Anterior displacement of an encircling band is a rare complication that may occur in the setting of ineffective suture placement and/or the dehiscence of thin sclera.2 Knobloch et al and Sternberg et al separately described creating scleral belt loops from donor sclera tissue to avoid placing sutures on very thin sclera in highly myopic eyes.2,3 The method has recently gained popularity as more SB procedures are performed under microscopy, as a “sutureless” surgery, or using 3D visualization systems.4–7 In this method, the encircling buckle material is anchored to sclera through a partial thickness circumferential scleral tunnel that is usually dissected using a crescent knife. Globe perforation through full-thickness
scleral dissection and damage to the choroid/retina is the most significant complication when creating scleral belt loops. Here, we report an early postoperative dehiscence of scleral belt loop tunnels that caused SB slippage presenting as painful diplopia.

Case Report

A 54-year-old female patient was referred for intractable right eye pain and diplopia after pars plana vitrectomy and SB for a macula-off rhegmatogenous retinal detachment. Her surgery was uneventful; an encircling #41 band (4 mm wide) was placed through scleral belt loop tunnels in each quadrant and fixated with a #70 silicone sleeve at the superonasal quadrant. The retina was noted to be completely attached on postoperative Day 1. On postoperative Day 2, the patient experienced progressively worsening pain in and around the operated eye along with vertical diplopia. She was treated with oral antibiotics and over-the-counter analgesics for possible orbital cellulitis but symptoms persisted. At four weeks after surgery, examination revealed a red and tender eye, limited ocular motility, and 40 prism diopter right hypotropia (Figure 1, A and B). The uncorrected visual acuity measured 20/300 by Snellen, and the intraocular pressure measured 25 mmHg. The conjunctiva was injected and chemotic with a fold of conjunctiva covering the inferior limbus. There was trace corneal edema, 1+ anterior chamber cells, and a fixed and mid-dilated pupil. Mild nuclear sclerosis was present, and the retina was attached. Right eye motilities were limited and painful in all directions (Figure 1). Forced duction test showed severe restriction in all directions, especially in supraduction and medial-duction and lateral-duction. An orbital computed tomography (CT) scan confirmed the absence

Fig. 1. A and B. A 40 prism diopter right hypotropia and severe limitation in up gaze at presentation (1 month after SB surgery). C and D. Computed tomography scans showed anteriorly displaced silicone tire.

Fig. 2. Postoperative Day 1 (A) and postoperative Month 1 (B) images show improved ocular motility.
of an orbital abscess; however, the encircling band appeared to be displaced anteriorly (Figure 1, C and D).

We decided to proceed with surgical exploration and a plan to remove the displaced SB (see Video 1, Supplemental digital content, http://links.lww.com/ICB/A121). During the surgery, the encircling band was found to be under the four rectus muscles and displaced anteriorly, pulling the inferior, medial, and lateral rectus muscles to the inferior limbus. The etiology was determined to be dehiscence of the inferonasal, inferotemporal, and supratemporal belt loop tunnels. The superonasal belt loop was intact. The anteriorly pulled rectus muscles had formed adhesions to the sclera, anterior to their original insertion. The superonasal silicone sleeve was cut and removed along with the silicone band. Fibrotic tissues around the muscle insertions were dissected and excised to ensure forced ductions were free in all directions.

On postoperative Day 1, pain and ocular motility improved significantly. There was no deviation or diplopia at the 1-week (Figure 2 A) and 1-month (Figure 2 B) follow-up visits. Best-corrected visual acuity improved to 20/25. The pupil stayed sluggish and mid-dilated, but corneal edema and anterior chamber cells resolved. The retina remained attached 6 months after the surgery.

Discussion

Scleral belt loop tunnels are becoming increasingly popular for securing the encircling band to the sclera.4–7 Spontaneous dehiscence of scleral loop tunnels is rare. Fukumoto et al8 reported a patient who presented with mild foreign body sensation and visible silicone band under the conjunctiva one year after a combined pars plana vitrectomy and SB surgery. Their surgical exploration showed dehiscence of scleral belt loop tunnels and migration of encircling SB most likely caused by thin scleral tunnels and cheese wiring through the sclera and rectus muscles.8 Spontaneous dehiscence of scleral belt loops has also been described in scleral expansion band segment surgery. Scleral expansion band segment placement is a controversial surgical treatment for presbyopia in which partial thickness scleral tunnels are created.9 In a series of 29 eyes who underwent scleral expansion band segment placement in scleral belt loops, one eye had a displaced band segment because of the dehiscence of a scleral belt loop.9 However, the authors did not report the interval between the procedure and buckle displacement or the presenting symptoms.9 Unlike these cases, dehiscence of SB belt loop tunnels and slippage of the SB in our case presented early after the surgery with acute diplopia and severe pain.

The most common reason for SB removal is postoperative pain due to infection and extrusion.10 Other risk factors for SB removal include buckle erosion and extrusion, Miragel composition of the buckle, and anterior segment ischemia.10 The rate of retinal redetachment after SB removal varies from no increased risk to almost one third of cases.10 In our patient, the retina remained attached at six months follow-up.

One possibility for spontaneous dehiscence of scleral belt loops in our patient is excessive tension over thinly dissected scleral tunnels that resulted in their dehiscence. A well-fashioned scleral tunnel with appropriate roof thickness is the best way to avoid such spontaneous dehiscence of scleral belt loop tunnels and resulting buckle slippage. Another possibility is an undiagnosed underlying systemic collagen disease that resulted in weaker scleral tunnels and may have led to the initial rhegmatogenous retinal detachment. Pain, diplopia, and a positive forced duction test raise suspicion for a displaced SB. CT imaging may aid the diagnosis. Early diagnosis and immediate surgical intervention to remove or adjust the buckle are crucial to minimize patient discomfort and improve long-term ocular motility.

Key words: belt loop scleral tunnel, diplopia, retinal detachment, retinal surgery, slipped buckle, slipped scleral buckle, scleral buckle.

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