Lateral fixation of sclera to the periosteum with medial rectus disinsertion for severe myopic strabismus fixus

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Myopic strabismus fixus is characterized by severe ocular motility restriction with the development of progressive esotropia and hypotropia. Management of severe cases with strongly positive forced duction test can be challenging. We describe a longstanding case of myopic strabismus fixus, which was managed by bilateral medial rectus disinsertion and scleral fixation laterally to the periosteum.

Key words: Myopia, scleral fixation, strabismus fixus

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Myopic strabismus fixus is a rare, restrictive ocular motility problem where there is progressive esotropia and hypotropia with restricted elevation and abduction. Various surgical procedures including recess-resect procedures, partial Jensen's procedure and loop myopexy have been described. Scleral fixation to the medial periosteum has been described for third nerve palsy with satisfactory results. We describe a severe and longstanding case of myopic strabismus fixus, which was managed by bilateral medial rectus disinsertion and scleral fixation laterally to the periosteum.

Case Report

A 76-year-old myope presented to us with complaints of defective vision and turning in of the eyes since the last 10 years. The patient reported that the right cornea had not been visible for the past eight years due to a considerable convergent deviation. His left eye had also started to turn inwards over the past two years. As a result his vision was hindered thus interfering with daily activities.

On examination, the best corrected visual acuity in the right eye was perception of light with accurate projection and in the left eye, counting fingers at 1.5 meters with accurate projection. His glasses had a prescription of ~6.5 diopter sphere with ~1.50 diopter cylinder at 175 degrees in the right eye and ~21.00 diopters in the left eye. Refraction was not possible due to the dense cataract in both eyes. Axial lengths were 32.70 mm in the left eye and 27.80 mm in the right eye. The right eye was severely esotropic with some hypotropia (which could not be measured as the eye could not take up fixation) and only the edge of the cornea could be visualized. The left eye showed esotropia of more than 90 prism dipters [Figure 1]. Ocular motility examination showed limitation of ocular movements in all directions of gaze, with minimal residual adduction. There was mild bilateral aponeurotic ptosis. Anterior segment examination revealed dense nuclear cataract in both eyes. Fundus could not be visualized in the right eye due to the severe esotropia and in the left eye, media was...
hazy and the retina tessellated with a posterior staphyloma. Ultrasound B scan showed increased axial length and posterior staphyloma in both eyes. Imaging was not performed due to cost considerations.

During surgery, severe restriction of ocular movements was noted in both eyes on forced duction testing, with only minimal adduction possible. Hooking of the medial rectus was difficult. The medial rectus muscle was disinserted at its insertion in both eyes. However, there was a large residual esotropia and forced duction testing did not reveal any remarkable improvement in the restriction after disinsertion. A conjunctival incision was made over the lateral rectus insertion. The conjunctiva was retracted laterally using a retractor. 6-0 prolene suture was then passed through the sclera just anterior to the lateral rectus insertion and then through the peristeum on the inner aspect of the lateral orbital wall, 2 mm inside the orbital rim. The suture was tugged to confirm passage through the peristeum and the conjunctiva was closed with 8-0 vicryl interrupted sutures [Figure 2]. The eyes were left in a position of 8-10 prism diopeters of abduction.

At six months of follow-up, there was residual esotropia of 20 prism diopeters in the right eye with 25 prism diopeters of hypotropia, however, the left eye was in the primary position with central fixation [Figure 3]. Ocular motility examination revealed limitation in all directions with minimal adduction. He had undergone cataract surgery in the left eye with a best corrected visual acuity of 20/60.

**Discussion**

Acquired strabismus fixus was described by Villaseca et al., and Martinez, who ascribed this to contracture of the medial rectus following lateral rectus paralysis. Acquired strabismus fixus has also been reported to be associated with amyloidosis and high myopia.

Restrictive ocular motility problems have been known to occur in high myopes. The currently accepted theory was given by Yokoyama, who suggested that the enlarged globe herniates superotemporally through the muscle cone. On magnetic resonance imaging (MRI), the superior rectus is seen to be nasally deviated and the lateral rectus muscle inferiorly deviated. Krzizok et al. noted a change in the muscle path of the lateral rectus muscle on MRI. They noticed an inferior displacement of the lateral rectus muscle.

Several surgical procedures have been attempted to treat convergent strabismus fixus in high myopes. Hayashi et al. found medial rectus recession-lateral rectus resection to be effective only in small deviations and performed transposition of the superior rectus and inferior rectus along with medial rectus recession in cases with severe limitation of abduction. Krzizok et al., fixed the lateral rectus muscle with a posterior fixation suture in the physiological meridian to the sclera. In order to compensate for the inferolateral displacement of the lateral rectus muscle, Yokoyama et al., performed a loop myopexy of the lateral and superior rectus muscles. Marked improvement in eye movement was noted. This is probably the best procedure as it addresses the problem of deviant muscle paths. Wong et al. performed loop myopexy of the lateral and superior rectus muscle with a silicon 240 band and tightening with a sleeve with a satisfactory result. Good outcome was noted with a partial Jensen’s procedure to appose the adjacent halves of the lateral and superior rectus muscles by Larsen et al. Periosteal fixation of the sclera has been performed for third nerve palsy with satisfactory results. In addition periosteal flaps have been used as globe tethers in severe paralytic strabismus.

Our patient had longstanding strabismus fixus with severe esotropia. The eyes were not aligned, even after medial rectus disinsertion and considerable resistance was felt on forced duction testing. Considering the resistance and the chance...
of recurrence, we went ahead with scleral fixation of the eyeball to the periosteum near the lateral orbital rim. Marked fibrosis possibly occurs in longstanding cases and procedures like transpositions or recession-resection may not be useful. This might also be the cause for the persistent restriction to abduction after medial rectus disinsertion. The right eye which was more severely afflicted initially was noted to have a residual esotropia and hypotropia. However, the left eye could be restored to the primary position. It is interesting that the less myopic right eye was the severely esotropic eye; the exact cause for this is unclear, but it could be related to more severe fibrosis associated with this eye. Imaging would have been useful to delineate the paths of the muscles. Loop myopexy addresses the basic problem, however, as the medial rectus was very tight on forced duction testing, our choice of surgical procedure was disinsertion and periosteal fixation. To conclude, scleral fixation can be considered as a surgical option in patients with gross restriction on forced duction testing in severe myopic strabismus fixus.

References