Large Angle Esotropia with High Myopia and a “Lost” Medial Rectus Muscle: A Case Report

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ABSTRACT: A 67 year old woman presented with her left eye fixed in adduction and infraction. She had previous complicated strabismus surgery 18 years ago with a report of intraoperative loss of left medial rectus (MR) muscle (not retrieved at the time of surgery).

An Orbital MRI of the left eye showed reattachment of the MR muscle to the globe and an axially enlarged globe associated with inferior displacement of the lateral rectus and nasal displacement of the superior rectus muscles. In ultrasonography the axial lengths were 24.1 mm in the right and 29.9 mm in the left eye. She underwent staged surgery: The first stage was a recession of the left MR muscle and union procedure on the SR and LR muscles followed by a second adjustable suture procedure under topical anesthesia, of right MR recession, right LR resection and left IR recession. After 12 months her eyes were still binocularly aligned.

Unilateral high myopia must be considered in progressive esotropia. Imaging and ultrasonography can demonstrate anatomical abnormality and muscle paths to confirm the definite diagnosis. Union procedure described by Yokoyama is an effective procedure in correcting this strabismus associated with high myopia.

Received for consideration January 30, 2013; accepted for publication March 1, 2013
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INTRODUCTION

Strabismus, associated with high myopia, is an acquired progressive esotropia and hypotropia leading to restriction in elevation and abduction (1).

Different pathological factors have been described for this clinical presentation in high axial myopic patients. High-resolution magnetic resonance imaging (MRI) has demonstrated the inferior displacement of the lateral rectus (LR) and medial displacement of the superior rectus (SR) muscles, probably due to an enlarged globe, that cause supratemporal herniation of the enlarged globe through the muscle cone (2).

Recently, many surgical procedures were described to re-align the eye(s) in these patients (1,3-4). Here we present a complicated strabismus case. In contrast to her previous strabismus surgery and lost left MR muscle, she presented with a large angle esodeviation in the context of a unilateral left high axial myopia.

CASE REPORT

A 67 year old female presented to the strabismus clinic with a large left esotropia and hypotropia and a fixed left eye in adduction and infraduction. The patient had a history of previous strabismus surgery for esotropia 18 years ago. According to the operation report, the left MR muscle was “lost” intraoperatively during the left MR muscle recession and was not retrieved at that time. The day after the surgery her esodeviation was improved from 105 PD to 85 PD, however, her deviation has been increasing over time until her presentation to our clinic.

Best corrected visual acuity was 8/10 in the right eye and 50 cm FC in the left eye. Refractive error in the right eye was -4x100. Due to the eye fixed in adduction and poor red reflex, it was impossible to estimate the refractive error in the left eye. On the left side, there was more than 90 PD esotropia and significant hypotropia with severe limitation of ductions (-6) except for infromedial duction. The remainder of the ophthalmological examination was unremarkable except for a dense lens opacity in the left eye.

In Ultrasonography the axial lengths were 24.1 mm in the right eye and 29.9 mm in the left eye. MRI and CT scan of the left eye showed reattachment of the medial rectus muscle to the globe along with inferior displacement of the lateral rectus and nasal displacement of the superior rectus muscles (Figure 1, Top, Next page ).
to the globe and high axial length of the left eye. B) Displacement of the superior and lateral rectus muscles in the left eye.

**Figure 2 (Akbari et al):** Preoperative left large angle esotropia, fixed left eye in adduction.

**Figure 4 (Akbari et al):** Orthotropia 1 year after second procedure.
Our Treatment Course

At our first operation, the "lost" left medial rectus muscle, found reattached to the sclera at 6.5 mm posterior to the limbus, was recessed to 15 mm from the limbus. Union procedure of the left superior and lateral rectus muscles was performed at 15 mm from the insertion with non-absorbable 5-0 polyester suture with neither splitting of the muscle nor suturing to the sclera as described by Yokoyama (1). Amniotic membrane transplantation was done in a conjunctival deficient area to cover the sclera.

Six months post operation she showed 50 PD residual esotropia and 12 PD residual hypertropia. Left eye ductions were improved to -1 limitation in adduction, -2 limitation in supraduction, -2 limitation in abduction and no limitation in infrafraction.

The second operation was done under topical anesthesia using adjustable suture technique. The forced duction test was positive for left inferior rectus muscle so the left inferior rectus muscle was recessed 4 mm. Then 6.5 mm recession of the right MR muscle and 8.5 mm resection of the right LR muscle was done.

Her eyes were binocularly aligned 12 months after the second operation. Ductions improved to -1 limitation in adduction in both eyes (Figures 2-4). There was no intra- or postoperative complication.

DISCUSSION

Various surgical plans have been proposed to correct strabismus associated with high myopia including large recession-resection which, not addressing the pathophysiology, seems not to be effective (4).

Yamada (3) reported another procedure by hemitransposition of the superior rectus and lateral rectus muscles with scleral fixation at 7 mm from the limbus.

It has been reported that the union procedure has been done between the split temporal half of the superior rectus and superior half of the lateral rectus muscles at 16 mm from the limbus (5).

Yokoyama and colleagues (1) reported on uniting the muscle bellies without splitting of the superior and lateral rectus muscles at 15 mm posterior to the insertion.

In these procedures in addition to correction of esotropia and hypertropia they improved abduction and supraduction. Also the risk of scleral perforation and anterior segment ischemia is eliminated (5).

Surprisingly, despite the history of the "lost" medial rectus muscle, our patient showed a progressive large angle esotropia following the surgery done 18 years ago. Generally, after a lost MR muscle in esotropia, we expect to encounter with a significant correction of esotropia, or even, with a consecutive exotropia, along with a significant adduction deficiency. Interestingly, deviation of our patient was decreased only from 105 PD to 85 PD the day after her complicated surgery, and also she had a very severe abduction deficiency.

 Orbital imaging (see prior page) was done to evaluate the lost medial rectus muscle position. Interestingly, the MR muscle was
detected reattached to the globe nearly at its insertion site. It was also noted that the left globe had a high axial length associated with displacement of the superior and lateral rectus muscles.

Among all complications of strabismus surgery, the “lost” muscle is one of the most alarming, which demands surgical patience and careful management.

Intraoperative, after scar release, the left MR muscle, reattached approximately at 6.5 mm from the limbus was detached. Since in larger globes the equator moves posteriorly; we recessed the left MR muscle 15 mm from the limbus (6).

We recessed the conjunctiva in conjunction with transplantation of the amniotic membrane for the conjunctival defect.

In our patient, displacement of the left superior and left lateral rectus muscles were demonstrated in MRI and intraoperatively; therefore a Yokoyama union procedure was done.

We believe in this patient progressive esotropia is explained by the high axial length and high myopia. Therefore, after the first surgery and despite the lost medial rectus muscle, the large inward rotated globe opposes the medial rectus muscle near to its original insertion, so the MR muscle was reattached to the sclera.

The Yokoyama procedure corrects a displaced globe, and diminishes the risk of scleral perforation and anterior segment ischemia, especially in patients who need multiple rectus muscle surgery as was the case in our patient.

In conclusion, unilateral high myopia must be considered in progressive esotropia. Imaging can demonstrate an anatomical abnormality and the muscle’s path. Union procedure, described by Yokoyama, is a very effective procedure in these patients.

REFERENCES