Resolution of anterior segment ischemia after the removal of lateral fixation sutures

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Anterior segment ischemia is a rare but well-recognized complication after strabismus surgery, involving multiple extraocular muscles. We report a case of traumatic left sixth nerve palsy in a 32-year-old man who developed anterior segment ischemia after left medial rectus muscle recession and partial tendon transfer of the vertical rectus muscles to the lateral rectus, augmented by lateral fixation sutures. The corneal edema and anterior chamber reaction cleared upon removal of the lateral fixation sutures and institution of steroids and cycloplegics. The possible role of lateral fixation sutures in anterior segment ischemia is discussed.

Case Report

A 32-year-old man with diplopia after trauma was referred to our clinic 5 months after falling from his motorbike into a pit. He had fractured both wrists and was unconscious for 4 hours. There was no record of ocular or orbital injury.

On examination, the patient had a visual acuity of 6/6 in both eyes. He had a left head turn of approximately 45° and a left esotropia of 60°. The left eye had a severe limitation of abduction and failure of the eye to reach midline. Abduction saccades were slow and the forced duction test for abduction was mildly positive. On force generation test, no tug was elicited when the patient was asked to make an abduction movement of the left eye. The remainder of the eye examination was normal. Computed axial tomography scan of the brain was within normal limits. A diagnosis of nonresolving left lateral rectus palsy was made. The patient was evaluated for systemic risk factors, including cardiac evaluation: no abnormality was detected. The patient was not on any medication, and his family history was unremarkable.

The patient underwent strabismus surgery under local anesthesia. After a 360° peritomy, the superior and inferior rectus muscles were isolated and cleared of intermuscular septa and check ligaments. The muscles were split in half; care was taken to spare the nasal ciliary vessel. After securing the temporal halves of the vertical rectus muscles with 6-0 Vicryl sutures (Ethicon, Aurangbad, India), the temporal halves were disinserted and reattached adjacent to the lateral rectus insertion, parallel to the spiral of Tillaux. Augmentation was accomplished with a 5-0 polyester suture on a spatulated needle 6 mm from the lateral rectus insertion; 1 mm of the lateral rectus muscle was also incorporated in the lateral fixation suture, both above and below. Some tension on the intact nasal half of the vertical rectus muscles was noted while tying the augmentation sutures. The medial rectus muscle was then recessed 6.5 mm.

On postoperative day 1, the patient had a consecutive exotropia of 40°, with 2° limitation of abduction and adduction (on a scale of 1 to 4). The left eye had severe corneal edema, folds in Descemet’s membrane, 2+ cells (on a scale of 1 to 4, mainly pigment with occasional nonpigmented cells) and 1+ flare (on a scale of 1 to 4). We prescribed hourly topical ofloxacin 0.3% and prednisolone acetate 1.0%, in addition to 40 mg oral of prednisolone once daily after breakfast and 2% homatropine thrice daily. However, the corneal edema continued to worsen during the next 2 days. On postoperative day 3, the iris architecture was flattened superiorly and nasally. The nasal pupillary margin was rotated posteriorly (Figure 1A). The lateral augmentation sutures were then removed under topical anesthesia. Some clearing of the corneal edema was noted 4 hours after removal of the sutures. Corneal edema in the superior and nasal quadrant resolved completely after 24 hours (Figure 1B). The inflammation gradually cleared with improvement in the texture of iris, during the week following the second surgery (Figure 1C).

One week after the second surgery, the patient had a 10° exotropia at distance and was orthophoric at near. Abduction was restricted −2; adduction was restricted −1. Systemic steroids were tapered over 4 weeks, whereas topical steroids were continued for 6 weeks with reducing frequency. The improvement was sustained at the last follow-up visit, 6 months after the surgery. Visually insignificant anterior subcapsular opacities, which were noted earlier, did not progress during this follow-up period.

Discussion

Partial/full vertical rectus muscle transposition has been recommended for abduction deficiency produced by lateral rectus palsy. Foster reported that the addition of lateral fixation sutures enhances the abduction effect obtained. Other studies have confirmed that this modification increases the mechanical effect of the transposition.
Anterior segment ischemia (ASI) is a rare but well-recognized complication of strabismus surgery. The risk of this complication increases with increasing number of rectus muscles being operated; medial rectus recession with half tendon transfer thus puts the patient at higher risk of ASI. It has been suggested that lateral fixation sutures may interrupt the blood flow through the long posterior ciliary arteries and compromise anterior segment circulation. Another possibility is that these sutures may compromise blood flow by stretching the intact half of the tendon and the nasal anterior ciliary vessel thereon. Increasing inflammation in the first 3 days and partial clearing of corneal edema after removal of these sutures suggests that these sutures had a possible causal role in onset of ASI. Circulation was regained gradually, however, as shown by the improvement in clinical signs, and topical and systemic steroids were continued; hence it could not be concluded that the augmentation sutures were solely responsible for ASI in our patient. Fluorescein angiographic studies of the anterior segment before and after removal of lateral fixation sutures could have helped to further clarify the etiology of ASI and resolution of corneal edema in our patient. The 360° peritomy may have also contributed to ASI in our patient, but this is difficult to prove at this stage. Cataract is a recognized feature of ASI. The nonprogression of opacities could be attributed to the recovery. We advocate caution with the use of lateral fixation sutures even in individuals without risk of ASI. Their possible role in causing ASI merits further study.

References


FIG 1. (A) Slit-lamp photograph at postoperative day 3 showing marked corneal edema. (B) Slit-lamp photograph at postoperative day 4 (one day after the second surgery) showing clearing of the superior and nasal corneal quadrants. (C) Slit-lamp photograph at one week after surgery showing resolution of corneal edema; in-turning of the nasal iris margin is noted.