Case Report

Hypotropic Dissociated Vertical Deviation; a Case Report

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Purpose: To report the clinical features of a rare case of hypotropic dissociated vertical deviation (DVD).
Case report: A 25-year-old female was referred with unilateral esotropia, hypotropia and slow variable downward drift in her left eye. She had history of esotropia since she had been 3-4 months of age. Best corrected visual acuity was 20/20 in her right eye and 20/40 in the left one when hyperopia was corrected. She underwent bimedial rectus muscle recession of 5.25mm for 45 prism diopters (PDs) of esotropia. She was orthophoric 3 months after surgery and no further operation was planned for correction of the hypotropic DVD.
Conclusion: This rare case of hypotropic DVD showed only mild amblyopia in her non-fixating eye. The etiology was most probably acquired considering hyperopia as a sign of early onset accommodative esotropia.

Keywords: Dissociated Vertical Deviation; DVD

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INTRODUCTION

Dissociated vertical deviation (DVD) is characterized by slow vertical drift of the non-fixating eye when the other eye is fixating on a target. Alternating slow upward drifts are common and usually accompany congenital esotropia and latent nystagmus.[1-3] Slow downward drift is very rare and only 9 cases have been reported in literature.[1]

Hypotropic DVD has frequently been unilateral with an acquired etiology. Intraocular injuries, high myopia, anisometropia and poor best corrected visual acuity (BCVA) have been reported as causes.[1] The mechanism of hypotropic DVD is generally unknown, but there are a few hypotheses. Bradsky et al[4] have postulated that asymmetric visual input from fellow eyes evokes vertical divergence. Jampolsky et al hypothesized that excessive innervation of the superior rectus of the fixating normal eye is the primary defect (Jampolsky A. A new operation for mono-ocular vertical slow oscillatory eye movements: a form of adult DVD. Proceedings of 25th Annual Meeting of American Association for Pediatric Ophthalmology and Strabismus; April 15-18, 1999; Toronto, Canada). This in turn leads to increased innervation of the ipsilateral inferior rectus to maintain fixation, which is transmitted to the yoked depressors of the fellow eye manifesting as downward drift. Guyton et al[5] postulated that in usual upward

DVD, the combination of cyclo-vertical vergence of the fixating eye which dampens the cyclo-vertical portion of latent nystagmus, leads to excycloduction and elevation of the non-fixating eye; but it is possible for the fellow eye to show downward drift by the same hypothesis. High myopia accompanied with a large globe, lateral rectus underaction, esotropia and hypotropia can be other causes of hypotropic DVD.[1] In this report we introduce the clinical features of a patient with hypotropic DVD.

CASE REPORT

A 25-year-old woman presented with esotropia of her left eye since the age of 3 to 4 months without any prior strabismus surgery or amblyopia therapy. She was apparently in good health.

Cyclorefraction was +3.74 -0.74 × 135° in her right eye, yielding BCVA of 20/25, and +3.5 -0.5 × 60° in the left eye with BCVA of 20/40. She had mild amblyopia and latent nystagmus in her left esotropic eye with appropriate corrective glasses. Worth-4-dot and Titmus tests revealed left eye suppression and no streopsis. There was bilateral lateral rectus and inferior oblique underaction (-1) together with bilateral superior oblique overaction (+2) with mild A-pattern. The function of other extraocular muscles was normal. While fixating with her right eye, prism alternate cover test revealed 40 and 45 prism diopters (PD) of esotropia in her left eye at far (6 m) and near (33 cm), respectively in addition to hypotropia of 3 PD accompanied by slow variable downward drift from 3 to 6 PD. While fixating with the left eye, there was no change in the position of the right eye. No extorsional movement was observed during downward drift which was not associated with manifest nystagmoid or rhythmic movements. Left eye hypotropia did not change with right or left gaze or head tilt. Slit lamp and fundus examination, and applanation tonometry were within normal limits in both eyes.

She underwent bimedial rectus muscle recession equal to 5.25 mm with 1/3 tendon width superior transposition to correct the esotropia and A–pattern simultaneously. Three months after surgery, while fixating with her right eye, mild esotropia and hypotropia of the left eye were occasionally observed (Fig. 1). When fusion was completely broken by the alternate cover test, 8 PD of esotropia and 3 PD of hypotropia with 3 to 4 PD of downward drift were measureable in her left eye (Fig. 2). We did not perform any additional procedure for correction of her hypotropic DVD since she seemed orthophoric most of the time and was satisfied with the result of the operation.

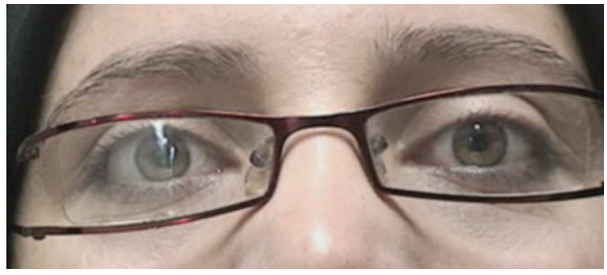

Figure 1. Three months after surgery, while fixating with her right eye, mild esotropia and hypotropia were observed in the left eye.

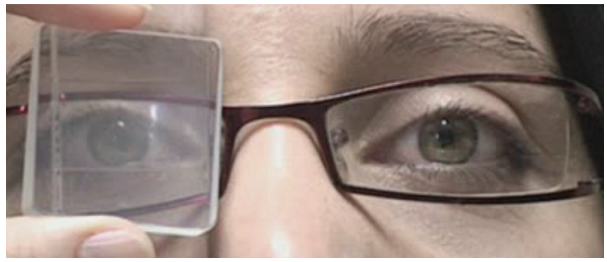

Figure 2. Three months postoperatively, when fusion was completely broken by the alternate cover test, 8 prism diopters (PD) of esotropia with a horizontal prism and 3PD of hypotropia and downward drift with a vertical prism were measureable in the left eye.

DISCUSSION

Our patient had esotropia and hypotropia together with slow downward drift only in her left eye while fixating with the right eye, without any associated extorsion or manifest nystagmoid or rhythmic movements similar to other reported cases of hypotropic DVD.[1-3] Our case showed some dissimilarities with previously reported cases regarding good BCVA in her non-fixating eye and the type of esotropia. Hypotropic DVD is mostly associated with poor vision in the non-fixating eye and linked with acquired

etiologies such as high myopia, anisometropia, deep amblyopia or intraocular injury.[1] Although our patient showed mild amblyopia in her non-fixating eye, she had good BCVA despite the unilateral hypotropic DVD.

Hypertropic DVD is frequently accompanied by congenital esotropia and latent nystagmus, and is thought to be originally congenital, however hypotropic DVD seems to have an acquired etiology.[1] Our patient had history of esotropia and latent nystagmus in her left eye since she was 4 months old, therefore the esotropia may be considered to be congenital, which is not in line with other reports on hypotropic DVD.[1-3] However, considering her hyperopic cyclorefraction, a diagnosis of early onset accommodative esotropia may be compatible with her type of deviation and the etiology may be considered as acquired.

Hypotropic DVD can be differentiated from hypertropic DVD since it shows downward instead of upward drift which is not associated with torsional, nystagmoid or rhythmic movements and congenital esotropia or latent nystagmus.[1] It should also not be confused with skew vertical deviation since no change in vertical deviation is observed on right or left gaze or with head tilt, and changes occur only with eye fixation. Skew deviation is a true hypertropia that obeys Hering's law and is commonly seen with brain lesions, whereas DVD and hypotropic DVD are dissociative deviations that do not adhere to Hering's law.[3] Hypotropic DVD is also different from the Heimann-Bielschowsky phenomena since it shows better BCVA and slow downward drift with no nystagmoid or rhythmic movements.[2]

Bradsky et al[4] hypothesized that asymmetric visual input from the eyes evokes anomalous vertical vergence. Less asymmetry in BCVA between both eyes in our patient and correction of esotropia possibly preserved vertical vergence leading to orthophoria and hypophoria after surgery.

In summary this rare case of hypotropic DVD showed mild amblyopia in her non-fixating eye, possibly with acquired etiology when considering hyperopia as a sign of early onset accommodative esotropia.

Conflicts of Interest

None.

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