CASE REPORT

Brown Syndrome Following Upper Eyelid Ptosis Repair

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ABSTRACT

Brown syndrome is characterised by impaired supraduction worse in adduction due to a restricted superior oblique tendon passing through the trochlea. A few reports have previously described Brown syndrome after upper eyelid surgery, including blepharoplasty and ptosis repair. The authors describe two additional cases of Brown syndrome following ptosis repair. The first case is a 65-year-old woman with new-onset vertical binocular diplopia following bilateral levator advancement surgery. Ocular motility examination demonstrated moderate impairment of elevation in adduction. The second case is a 35-year-old woman who presented with new-onset intermittent binocular diplopia following right upper lid ptosis repair. Examination revealed large vertical fusional amplitudes and a large left intermittent hyperphoria in an alignment pattern consistent with Brown syndrome. Despite presenting after surgery, these cases differ in mechanism. The first case likely occurred due to intraoperative impairment of the superior oblique tendon sheath or trochlea, whereas the second case represented an unmasking of a long-standing, previous vertical strabismus that was consistent with a Brown syndrome pattern.

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Introduction

Strabismus is a rare but recognised complication of eyelid surgery.^{1–3} Characterised by restriction of elevation that is worse in adduction resulting in ipsilateral hypotropia, Brown syndrome occurs owing to restriction of the superior oblique tendon passing through the trochlea. We describe two cases of Brown syndrome presenting after ptosis repair and review the relevant literature. The collection and evaluation of protected patient health information for this report were HIPAA (Health Insurance Portability and Accountability Act of 1996) compliant.

Case presentation

Case 1

A 65-year-old woman was referred for vertical binocular diplopia and altered depth perception that she first noted about 2 weeks following an otherwise uncomplicated bilateral levator advancement surgery by an outside provider. The vertical binocular diplopia occurred only when she looked up and to the right. The nature and frequency of diplopia did

not fluctuate. She had no additional symptoms of thyroid dysfunction or myasthenia gravis.

Extraocular motility (Figure 1) was full in the right eye and in the left eye revealed an isolated moderate elevation deficit in adduction consistent with Brown syndrome. Alternate cover testing showed a 4 prism dioptre (Δ) right hypertropia in right gaze that increased to 8 Δ in right upgaze and decreased to 2 Δ in right downgaze. She was orthotropic in all other gaze positions, including head tilt to both sides. The remainder of the examination was remarkable for well-healed bilateral upper lid incisions. Her clinical examination, including motility and alignment, remained stable 1½ years following surgery and 4 months following initial clinic visit. Strabismus surgery and prisms were deferred given her minimal symptoms.

Case 2

A 35-year-old otherwise healthy woman presented for diplopia following right upper lid ptosis repair. The patient had history of right upper eyelid ptosis first noted at age 5. An aunt and brother also had early

Figure 1. A nine-gaze motility series demonstrated impaired supraduction of the left eye in adduction.

childhood unilateral upper eyelid ptosis. Her ptosis slowly progressed, leading to initial surgical repair at an outside institution 4 months prior to her neuro-ophthalmology consultation. In the operative report, the levator aponeurosis was described as thin and challenging to define. Following aponeurotic advancement, the eyelid did not lift as expected. She underwent a repeat right upper eyelid ptosis repair 3 months later with repeat dissection of the levator aponeurosis. A tarsectomy was performed with advancement of the levator aponeurosis and Müller muscle. Approximately 5 days postoperatively while on narcotic pain medication, the patient noticed new-onset intermittent binocular diplopia. The diplopia would usually resolve quickly with blinking. Over several months, the diplopia improved but remained in left gaze when watching television late at night.

Two months after diplopia onset, neuro-ophthalmic examination showed essentially full ductions. Versions testing revealed a dramatic downshoot of the right eye in left gaze. Alternate cover testing revealed 16 Δ left hyperphoria increasing to 30 Δ in left gaze and 20 Δ in upgaze, and decreasing to 4 Δ in right gaze and downgaze. There was no torsion in either eye. Vertical fusional amplitudes measured at least 25 Δ . She demonstrated good control of her hyperphoria in all gaze positions except far left gaze and left upgaze. On follow-up 5 weeks later, diplopia remained transient and her examination was stable.

Discussion

Brown syndrome is characterised by restriction of the superior oblique tendon as it passes through

the trochlea. The most prominent clinical feature is limitation of globe elevation in adduction.⁴ Widening of the eyelid fissure in adduction and hypotropia in primary gaze are variably present. Brown syndrome can be congenital or acquired; the latter is typically related to superior oblique tendon dysfunction at the trochlea from inflammation, surgery/trauma, thyroid disease, or orbital mass.⁵

In the superonasal orbit, the superior oblique tendon lies in close proximity to the medial edge of the levator palpebrae superioris aponeurosis.⁶ Surgical manipulation in this region during ptosis surgery, blepharoplasty, or orbital mass biopsy can lead to damage of the superior oblique tendon and/or trochlea. Involutional changes of the upper eyelid, such as medial dehiscence of the Whitnall ligament, fatty infiltration of the levator muscle, and lateral tarsal shift can disturb normal anatomy and increase the risk of inadvertent injury to the trochlea.⁷ Despite this close anatomical relationship, Brown syndrome following eyelid surgery has only rarely been reported in the literature.

Over a 32-year chart review from an academic strabismus practice, Kushner and Jethani identified three patients who developed Brown syndrome following upper lid surgery (levator excision, levator resection and upper lid blepharoplasty).⁶ In the two cases that required subsequent strabismus repair, scarring was seen in the superonasal orbit involving the superior oblique tendon. Syniuta et al. reported 12 cases of vertical strabismus following eyelid blepharoplasty; among five patients with an acquired

superior oblique palsy, one also had a concomitant acquired Brown syndrome.³ Among a retrospective cohort of 85 patients with Brown syndrome, Wright identified one case complicating an upper eyelid blepharoplasty.⁵

Our two cases of Brown syndrome presenting after levator advancement or resection surgery highlight that the mechanism may vary. In case 1, there was presumed iatrogenic damage to the superior oblique tendon sheath or trochlea during surgery resulting in an acquired Brown syndrome. In case 2, the patient's exceptionally large 25 Δ vertical fusional amplitudes (normal controls = 2–3 Δ) supports that the patient had a latent Brown syndrome pattern vertical strabismus preoperatively that became symptomatic, from diminished fusional amplitudes following surgery. Fusional amplitude impairment commonly occurs with fatigue.⁸ The postoperative period has numerous potential sources of fatigue, including stress, anxiety, insomnia, pain, and narcotic medications.⁹ Additionally, it is possible that the patient's anatomy contributed to inadvertent surgical manipulation near the trochlear region, leading to an unmasking of her previously compensated strabismus.

Conclusions

Given their relative proximity, damage to the superior oblique tendon can rarely occur during levator palpebrae superioris aponeurosis surgery. Eyelid surgeons should remain cognisant of this anatomical relationship intraoperatively. In patients with longstanding, previously latent

Brown syndrome, eyelid surgery can result in impaired fusional amplitudes and symptomatic diplopia. Clinicians may consider adding diplopia to the list of potential risks of blepharoplasty and levator aponeurosis ptosis repair.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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