

Isolated Rupture of Extraocular Muscles in A Severe Penetrating Trauma— “A Globe Shielded by Muscles”

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Abstract

Traumatic rupture of an extraocular muscle is rare. We report an unusual case of Superior oblique and medial rectus rupture after a penetrating trauma by metallic hook. Surgical repair was combined with botulinum toxin injection into the ipsilateral antagonist to prevent consequent contracture thus also augmenting the orthoptic outcome.

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ABSTRACT

Traumatic rupture of an extraocular muscle is rare. We report a rather unusual case of Superior oblique and medial rectus rupture after a penetrating trauma by metallic hook. The surgical repair was combined with botulinum toxin injection into the ipsilateral antagonist to prevent consequent contracture thus also augmenting the orthoptic outcome.

Key Words: Muscle Rupture, ocular trauma, vertical strabismus, botox, hook injury.

Key message: Isolated extraocular muscle injury is uncommon. Identifying the muscle intraoperatively is challenging. In our case report we opted for primary suturing combined with intramuscular botulinum that provided a favorable outcome.

INTRODUCTION

Injury to extraocular muscles without significant damage to globe is an infrequent clinical finding. In suspected cases of extraocular muscle rupture, prompt surgical exploration is needed to prevent persistent diplopia, strabismus and distressing abnormal head posture. Reports of isolated extraocular muscle ruptures are sparse in literature.^[1-4] This case is unique as it involves combined medial rectus and superior oblique rupture after a penetrating trauma evading any trauma to globe.

CASE REPORT

A 70 year old mill worker presented with alleged history of metallic hook injury to his left eye (LE) following which he had pain and bleeding from his left eye of two days duration. He did not complain of any defective vision or double vision. On examination, his best corrected visual acuity was 6/12 (snellen's visual acuity chart) at distance, N6 at near in each eye. He was preferring to keep a right head tilt. On slit lamp biomicroscopy, LE had lid ecchymosis with oedema and a supero-medial conjunctival tear measuring about 7 x 2 millimetres with chemosis. A white strip of ruptured muscle tissue was observed prolapsing out through the conjunctival defect. (Figure 1) Remaining anterior segment findings and pupillary reflex were within normal limits. Orbital rim was intact. On orthoptic evaluation, he exhibited about 45 Prism Dioptres (PD) exotropia with 6 PD hypertropia in primary position. The hypertropia worsened on head tilt to left.

LE Ocular motility was restricted in adduction, dextrolevation, dextrodepression and elevation gazes. LE Fundus evaluation revealed extorsion. The right eye was clinically unremarkable.

The patient was planned for left eye wound exploration. Intra-operatively, forced duction test was negative in left eye. The prolapsed tendon was traced to its insertion and identified as the distal part of left superior oblique tendon. The proximal part of the superior oblique tendon could not be recovered. The strayed hanging tendinous tissue was excised near the medial border of the superior rectus muscle.

On further exploration of the nasal side, a ruptured medial rectus muscle was found partly protruding through tear. The proximal segment of the muscle was found to be retracted within its Tenon sleeve. It was meticulously retrieved by following the tendon sheath posteriorly. It took several attempts to suture the proximal segment as the muscle stump was highly friable, causing repeated cheese-wiring. The muscle was securely reattached to the globe with a non-absorbable synthetic suture as anterior as possible. Ten units of Botulinum toxin was injected over the ipsilateral lateral rectus muscle.

The large conjunctival defect was covered with sterilized amniotic membrane graft. Histological examination of the resected tissue confirmed them to be extraocular muscle with granulation tissue.

Postoperative examination on day 1 revealed symptomatically good recovery with return of adduction past midline. There were no complaints of diplopia. The patient got relieved from his abnormal head posture. Orthoptic evaluation showed a 4 PD left hypertropia in primary position, 14 PD left hypertropia in dextrodepression along with 10 PD hypertropia on ipsilateral head tilt. Orthoptic evaluation on postoperative 1 month revealed the same findings as on postoperative day 1 (Figure 2). However, patient was cosmetically well aligned and satisfied.

DISCUSSION

Injuries to the extraocular muscles have been infrequently reported and are usually associated with penetrating orbital trauma.^[1-4] Medial rectus is the most commonly injured extraocular muscle followed in order of decreasing frequency by the inferior, superior and lateral recti; the oblique muscles are quite rarely damaged.^[5] Direct injuries to superior oblique (SO) muscle is usually results from trauma by hook shaped objects. Such objects also cause an associated eyelid injury. Due to the ruptured muscle belly, the presentation mimicked superior oblique muscle palsy.^[6] As per Harish et al. meticulous excision of prolapsed SO tendon near nasal margin of superior rectus prevents muscle sequele. He suggested that could be due to unscathed fibres of SO^[7]

We report an isolated traumatic rupture of two unaccustomed extraocular muscles at their mid-belly without any globe injury. This contrasts with most of the previously reported cases wherein the site of rupture was usually near the tendon insertion.^[8] Anatomical restoration was challenging in this patient as it was difficult to secure a firm suture in the deeply retracted friable proximal muscle segment for a direct muscle-to-muscle anastomosis. However, a strikingly good primary position alignment was achieved without a direct muscle-to-muscle anastomosis in our case. This is possibly presumed to be, because of the intact innervation to the proximal muscle segment while the distal segment has become fibrotic and merely serves to convey the residual action of proximal part of the medial rectus onto the globe. Three months after the surgical procedure, the patient was cosmetically content and muscle function was more than better.

In conclusion, when the superior oblique muscle is injured, an intraoperative re-approximation of the muscle can be performed. As surgical re approximation is not a permanent solution, late post-operative sequele must be equated requiring periodic follow up.^[9] Also, supplementing the surgery with botulinum injection to the antagonist, attributes well to the outcome.

Data Availability Statement

Not applicable

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Conflict Of Interest Disclosure

The Authors declare that there is no conflict of interest. For guidance on conflict of interest statements.

Ethics Approval Statement

Ethics committee approval has been taken for this case report.

Patient Consent Statement

Written informed consent for patient information and images to be published was provided by the patient.

Permission To Reproduce Material From Other Sources

Not applicable

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FIGURESFigure 1: Preoperative nine gaze photograph showing medial conjunctival tear, prolapsed torn medial rectus tendon (black arrow). There is Left exotropia with hypertropia in primary gaze with adduction and dextroversion deficit. Figure 2: Post operative Day one nine gaze photograph showing improved alignment. In primary position a small left hypertropia is present. Definite improvement in adduction is evident.



