

Case report

Horner Syndrome Following Penetrating Neck Injuries: A Case Series

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Abstract

To report three cases of Horner syndrome associated with penetrating neck injuries and the result of surgery for correcting the resulting ptosis. This is a retrospective case series study of 3 patients with Horner syndrome with past history of penetrating trauma to the neck. The patients' history and the surgical results are presented. Muller's muscle conjunctival resection was successfully used to treat ptosis in traumatic Horner syndrome in two cases. In the clinical setting of acute traumatic injury to the neck, careful evaluation for signs and symptoms of Horner syndrome should be performed. Horner syndrome and associated ptosis can be effectively managed using Muller's muscle conjunctival resection.

Keywords: Wounds; Penetrating; Neck; Horner Syndrome; Ptosis.

Article Notes: Received: May 10, 2019; Received in revised form: Jun. 2, 2019; Accepted: Jul. 15, 2019; Available Online: Oct. 1, 2019.

How to cite this article: Eshraghi B, Jamshidian Tehrani M, Momenaei B, Tayebi F. Horner Syndrome Following Penetrating Neck Injuries: A Case Series . Journal of Ophthalmic and Optometric Sciences . 2019;3(4): 42-6.

Introduction

Any pathologic process along the sympathetic chain from its course in hypothalamus to the eye can produce Horner syndrome¹. Johann Friedrich Horner, a Swiss ophthalmologist, first described this syndrome in humans in 1869². Common clinical features of a patient with Horner syndrome are ipsilateral miosis, facial anhidrosis and ptosis³. Ptosis may involve the upper or lower eyelid (reverse ptosis) and may lead to false impression of enophthalmos due to narrow palpebral fissure⁴.

The causative lesions leading to clinical manifestations of Horner syndrome are classified into three categories according to their anatomical location: first order neuron injury (central), second order neuron injury (preganglionic), third order neuron injury (postganglionic)⁵. There are several conditions that may result in this pathological phenomenon. Among these, neoplasia is the most common. Other associated etiologies include penetrating injuries to the neck, carotid artery dissection, birth trauma to brachial plexus, lesions of brainstem and spinal cord and iatrogenic causes³.

Here we report three cases of post traumatic Horner syndrome following penetrating injury to neck region. The patients' history and the surgical results are presented.

Case Report

Case 1

A 45 year old man came to our clinic with chief complaint of mild ptosis of the right eye since 4 months ago. He mentioned a history of street-fight with knife causing penetrating trauma to his right side of the neck, which was managed by a vascular surgeon with stable condition and without notable complications.

Best corrected visual acuity was 20/20 in both eyes. Intraocular pressure and anterior segment exam was normal except mild miosis of the affected side. Funduscopy exam was unremarkable. Marcus Gunn pupil was not present. Anisocoria was more prominent in dim illumination. Diagnosis of Horner syndrome was made clinically and topical phenylephrine 2.5% was used to predict whether surgical procedure on Muller muscle is effective or not. Finally Muller's muscle-conjunctival resection of 8 mm was performed on upper eyelid with good results (Figure 1).

Case 2

A 29 year old man was referred by his general surgeon due to possible diagnosis of Horner syndrome following stab wound in his neck about 3 months prior to referral. His wound was explored and sutured at that time. Examination revealed mild ptosis of the right eye with margin to reflex distance 1 (MRD 1) of 3 mm and greater anisocoria in dark. He had no complaint of anhidrosis. The patient was scheduled for ptosis surgery but he refused to undergo the treatment (Figure 2).

Case 3

A 26 year old man presented due to sensation



Figure 1: (A) scar of previous neck trauma, (B) preoperative face photo with right side ptosis and miosis, (C) postoperative face photo

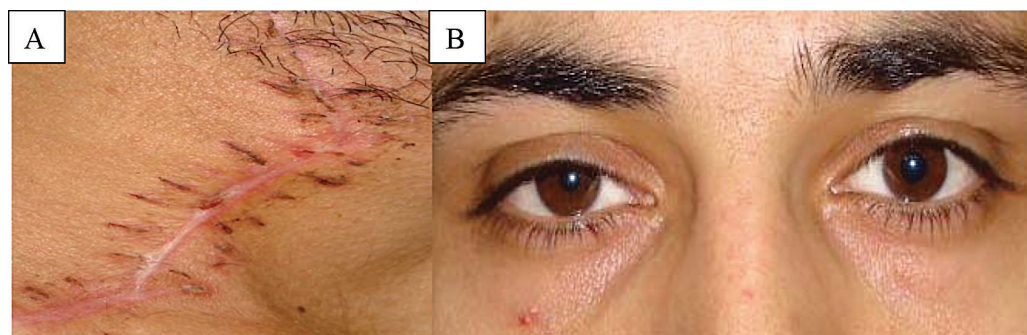


Figure 2: (A) Scar of repaired penetrating neck trauma, (B) Face photo showing right side miosis and mild ptosis

of abnormal eyelid position in the left eye after fighting and penetrating injury with glass to his left side of the neck, which was repaired by a surgeon 5 months prior without vascular complications. Scar of previous surgery was detected in the neck region. Clinical exam revealed ipsilateral ptosis and miosis and apparent enophthalmos. Other ophthalmic exams were unremarkable. Phenylephrine test was positive and the patient was a candidate for 8 mm Muller's muscle-conjunctival resection of the left upper eyelid which was effective in resolving upper lid ptosis. Postoperative results are shown in Figure 3.

Discussion

The presence of a lesion at any point along the oculosympathetic pathway can result in Horner syndrome. The sympathetic innervation of the eye consists of a three order neuron system. Sympathetic pathway originates in the posterolateral region of the hypothalamus. The first order fibers descend through the brainstem to anteromedial column of spinal cord up to level of C8-T2. After synapsing in the ciliospinal center of Budge and Waller the postsynaptic second order neurons leave the spinal cord in the ventral rami and pass through inferior and middle cervical ganglion and finally synapse in the

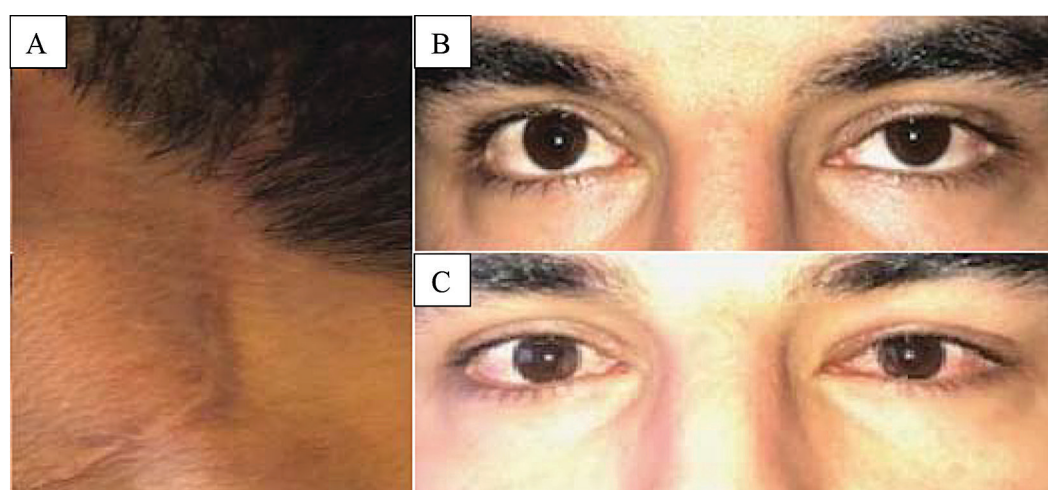


Figure 3: (A) Site of penetrating neck injury, (B) Preoperative face photo consistent with left side ptosis and miosis, (C) Postoperative face photo with improvement in ptosis

superior cervical ganglion at the level of carotid artery bifurcation. The third order neurons travel to the cavernous sinus and then attach to the abducens and ophthalmic nerve and innervate retractor muscles of the eyelid (Muller muscles), dilator muscles of pupil and lacrimal glands ⁶. The Horner syndrome is characterized by miosis, ptosis, anhidrosis and ipsilateral vascular dilation. Miosis is reported to be the most constant sign ⁷. A variety of conditions may result in the presentation of Horner syndrome. Neoplasia is responsible for 35 % -60 % of cases and is the most contributing factor, while iatrogenic injuries are present in 10 %-18.5 % of cases and trauma is the causative factor in 4 %-13 % of cases ⁸.

Horner syndrome is a rare clinical presentation in the setting of trauma. Fabian et al., ⁹ have reported that 7 % of patients with blunt carotid trauma present with Horner syndrome. Penetrating neck injuries can result in sympathetic nerve damage at different levels including direct injury to the lateral cervical cord, injury to the vertebral artery and interruption of blood supply causing ischemia to the lateral cord, direct injury to the sympathetic chain or ganglia and injury to the third order neurons traveling in the adventitia of the carotid artery ¹⁰.

Combination of Brown-Sequard syndrome (ipsilateral hemiplegia and loss of tactile and proprioceptive sensation and contralateral loss of pain and temperature sensation) and Horner syndrome is reported in cases of penetrating neck injuries due to trauma to spinal cord and sympathetic pathway ^{11,12}.

There are some previously reported cases of Horner syndrome following penetrating injuries to the neck ^{13,14}. Muller's muscle

conjunctival resection is a form of posterior approach for correcting mild to moderate amount of ptosis firstly described by Putterman in 1975 ¹⁵. Preoperative phenylephrine test is a commonly used method in predicting response to Muller's muscle resection and quantifying the amount of muscle needed to be resected ¹⁶. Dresner described a strong linear correlation between the quantity of Muller muscle resected and postoperative correction of ptosis with a 68 % rate of eyelid height symmetry ¹⁷. In 1990, Glatt et al., ¹⁸ presented 6 cases of ptosis associated with Horner syndrome with positive phenylephrine test who underwent Muller muscle-conjunctival surgery. They claimed that the mechanism of effect of this procedure is independent of active contraction of Muller muscle since it is nonfunctional in Horner syndrome cases.

In our study we presented three cases of penetrating injury to the neck with signs and symptoms consistent with Horner syndrome. We also reported the results of Muller's muscle conjunctival resection in two of our cases with acceptable cosmetic outcomes.

Conclusion

In the clinical setting of acute traumatic injury to the neck, careful evaluation for signs and symptoms of Horner syndrome should be performed. Horner syndrome and associated ptosis can be effectively managed using Muller's muscle conjunctival resection.

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Footnotes and Financial Disclosures

Conflict of interest

The authors have no conflict of interest with the subject matter of the present manuscript.