

A Case of Traumatic Isolated Unilateral Sixth Cranial Nerve Palsy

Vierlia, Wino Vrieda*

Department of Ophthalmology, Saiful Anwar Hospital – Brawijaya University, Malang, Indonesia.

*Corresponding author

Vierlia, Wino Vrieda, Department of Ophthalmology, Saiful Anwar Hospital - Brawijaya University, Malang, Indonesia, E-mail: vrieda_v@yahoo.com.

Submitted: 09 Feb 2017; Accepted: 02 Mar 2017; Published: 07 Mar 2017

Abstract

Traumatic isolated sixth cranial nerve palsy is a rare condition that has been reported to be as low as 1% to 2, 7% following traumatic brain injury. The sixth nerve innervates the ipsilateral lateral rectus which abducts the eye. Isolated loss of lateral gaze with no other cranial nerve signs and muscular entrapment is thought to be resulted from an injury to the peripheral nerve along its course from the brain stem to the lateral rectus. We presented a case of traumatic isolated unilateral sixth cranial nerve palsy in a female patient with diplopia and restriction left eye movement to lateral following head trauma after accident. Head Computed Tomography (CT) scan showed left frontal bone fracture involving the lateral wall of the orbit and also left retro orbital hemorrhage with no other lesions noted in the brain. Eye examination revealed isolated sixth cranial nerve palsy with normal vision of both eyes. Here we discussed about the possible mechanism, differential diagnosis and also management of the patient.

Keywords: Sixth cranial nerve palsy, Diplopia, Trauma.

Introduction

The sixth cranial nerve or abducens nerve is pure motor nerve and physiologically has the function to innervate the lateral rectus muscle. This nerve is responsible for the ocular movement to the lateral horizontal gaze. An impairment of the abducens nerve will result in esotropia and double vision with various degree of severity. Damage of the sixth cranial nerve may occur from lesions along its route between the nucleus that lies at the level of pons and the intra orbital part within the annulus of Zinn and lateral rectus muscle. The abducens nerve is the longest subarachnoid course among the cranial nerves [1, 2]. The differential diagnosis for lateral gaze palsy may include traumatic, brain stem lesion, brain tumor, idiopathic intracranial hypertension, peripheral nerve injury, and lateral rectus muscle entrapment or injury. The same symptoms and signs are often seen in cases of trauma. It is important to distinguish between the lateral rectus muscle entrapment in blow out fractures and peripheral nerve injury in terms of the standard treatment and avoiding unnecessary surgery. Physical examination and proper neuroimaging tests are needed to distinguish the causes of the nerve impairment [3, 4].

Case Report

A 44-year-old female patient was referred to hospital with diagnosis of head trauma and multiple facial fractures after motor vehicle accident. She had suffered from traumatic brain injury and transient altered level of consciousness and was assessed to have a score of 10/15 in Glasgow Coma Scale. She was then referred to Ophthalmology Department because of the misalignment of the left eye and also symptoms of double vision.

An urgent Head Computed Tomography (CT) scan revealed fracture of the left frontal bone involving the lateral wall of the

orbit. There was also left retro orbital hemorrhage with no other lesions noted in the brain (Figure 1).



Figure 1: Head CT scan showed left frontal bone fracture with retro orbital hemorrhage.

Physical examination showed multiple sutured lacerations on both sides of the face. Mild esotropia of the left eye was seen on primary position (Figure 2). Eye examination revealed left isolated sixth cranial nerve palsy (Figure 3). Force duction test stated no restriction. Other cranial nerves and vision test were normal. Anterior and posterior segment examination also revealed no abnormality.



Figure 2: Multiple sutured facial lacerations with left eye mild esotropia on primary position.



Figure 3: Left lateral gaze impairment of left eye.

She was undergone open reduction and internal fixation to treat the facial fractures. Systemic steroid treatment with tapering dose was also given postoperatively. Improvement of the lateral gaze restriction and reduction of diplopia were gained after ten weeks of follow up.

Discussion

Bilateral diplopia is overcome by occluding one eye and usually caused by the misalignment of the visual axes with numerous different etiologies. Horizontal diplopia related to the impairment of neural control or function of the extra ocular muscles. The worsening diplopia with the direction of gaze may be useful to discover which the extra ocular muscle involved [5].

Esotropia with the ipsilateral weakness of abduction indicates the involvement of the sixth nerve. The sixth nerve is the longest among all cranial nerves and allocated into five segments which are the nucleus, fasciculus, basilar, intra cavernous and intraorbital. Impairment of the nerve within each segment may be identified by the involvement of adjacent anatomy [2, 6].

The damage of the traumatic isolated sixth nerve is mostly originated from two locations. First is the angle over the tip of the petrous bone and second is through the Dorello's canal under the petroclinoid ligament. Lesions within the intra cavernous sinus will generally produce symptoms involving multiple cranial neuropathy. While the craniofacial trauma includes orbital wall fracture may cause entrapment of the extraocular muscles that creates impairment of ocular movement [4, 7, 8].

It is important to distinguish the etiology and mechanism of the nerve injury in patient with sixth nerve palsy following trauma. Intracranial hemorrhage, basilar and orbital wall fractures, also the peripheral nerve injury may be detected using radiographic imaging. MRI is better to changes of soft tissue and resolution in orbital apex while CT scan is the best option to assess bony abnormalities and intracranial hemorrhage [9].

Management of traumatic sixth nerve palsy generally requires conservative treatment although TalebNejad, et al. concluded that injection of botulinum toxin-A may eliminate the diplopia during acute stage of sixth nerve palsy. Based on Holmes et al study, spontaneous recovery was found more often in unilateral cases (84%) than in bilateral cases (38%). Our patient was also treated conservatively by giving steroids and the partial improvement was seen after 10 weeks of follow up [10,11].

References

1. Goodwin D (2006) Differential Diagnosis and Management of Acquired Sixth Cranial Nerve Palsy. *Optometry* 77: 534-539.
2. Azarmina M, Azarmina H (2013) The Six Syndromes of the Six Cranial Nerve. *J Ophthalmic Vis Res* 8: 160-171.
3. Reddy SP, Pujari MR (2016) Post-traumatic Bilateral Abducens Nerve Palsy: A Case Report. *International Journal of Scientific Study* 3: 195-196.
4. Jaiswal M, Jain S, Gandhi A, Sharma A, Mittal RS (2014) A Rare Case of Post Traumatic Isolated Bilateral Abducens Nerve Palsy. *Romanian Neurosurgery* XXI 4: 492-492.
5. Danchaivijitr C, Kennard C (2004) Diplopia and Eye Movement Disorders. *J Neurol Neurosurg Psychiatry* 75: 24-31.
6. Marais W, Barret S (2013) An overview of the third, fourth and sixth cranial nerve palsies. *CME* 31: 147-152.
7. Kidani N, Onishi M (2014) The Supposed Intracavernous Sinus Arachnoid Cyst with Abducens Neuropathy: A Case Report. *Neurol Med Chir (Tokyo)* 54: 582-586.
8. Roth FS, Koshy JC, Goldberg JS (2010) Pearls of Orbital Trauma Management. *Semin Plast Surg* 24: 398-410.
9. Cantor LB, Rapuano CJ, Cioffi GA (2014) Neuro Imaging in Neuro-Ophthalmology. *Neuro-Ophthalmology Basic and Clinical Science Course*. Section 5. Chapter 2. American Academy of Ophthalmology.
10. TalebNejad MR, Eghtedari M (2006) Botulinum Toxin-A Injection in Acute Sixth Nerve Palsy. *Iranian Journal of Ophthalmology* 19: 34-37.
11. Holmes JM, Beck RW, Kip KE, Droste PJ, Leske DA (2001) Predictors of non recovery in acute traumatic sixth nerve palsy and paresis. *Ophthalmology* 108: 1457-1460.

Copyright: ©2017 V Wino Vrieda. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.