CASE REPORT

Bilateral abducens paralysis following head injury: a case report

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Abstract

Cranial nerve lesions often accompany head trauma. Olfactory, facial and vestibular nerves are the most commonly injured nerves. Optic and oculomotor nerve injuries are less frequently involved, and trigeminal, abducens and lower cranial nerves are rarely involved. The injury may occur in central nervous system or in the lower motor unit. Traumatic bilateral abducens paralysis is a very rare occurrence. It may follow cervical spine trauma and sixth nerve avulsion has been reported to complicate lumbar puncture. In this study, we describe an 11-year-old boy with bilateral abducens paralysis following hematoma in the left ponto-cerebellar angle and hemorrhage in the prepontine cisterns due to head trauma. Such hemorrhages might result in lesions in the supranuclear regions by traction on the nerve due to displacement of the pons and its nucleus as a result of direct pressure. (J Pediatr Neurol 2003; 1(2): 107-109).

Key words: abducens nerve, paralysis, head trauma.

Introduction

Injury of abducens nerve is an unusual complication of cranial fossa fracture. Facial nerve paralysis and deafness are usually associated (1,2). Posttraumatic bilateral isolated involvement of the abducens nerve is commonly seen with

hyperextension injury of the cervical vertebra. It has been suggested that the mechanism is due to bilateral avulsion of the abducens nerve under pteroclinoid ligament with shift of the brain upwards. Following fractures of the petrous bone, paralysis of the sixth nerve may occur with the 7th and 8th cranial nerves. The sixth cranial nerve may also be injured with the third and fourth nerves within the superior orbital fissure. Furthermore, increased intracranial pressure and herniation may also cause paralysis of the sixth nerve (3-5).

Abducens nerve paralysis usually resolves spontaneously within 4 months. One may wait for the nerve functions to normalize within 6 months and after this period if the nerve is not recovered, local muscle shortening procedures may be applied (2,5).

Case Report

An 11-year-old boy was brought to the emergency service of our hospital after a traffic accident. Findings on neurological examination were as follows: he was drowsy, opening his eyes with verbal orders and localizing painful stimuli. Pupils were in the midline and isochoric. Direct and indirect light reflexes were normal. No lateralizing finding was observed. Babinski sign was positive bilaterally. No significant pathology was observed on cranial computerized tomography (CT) scans and also no pathology was observed on spinal films. The patient was admitted to our clinic and initiated on conventional anti-edema treatment. Cranial magnetic resonance imaging (MRI) was obtained because bilateral abducens paralysis was diagnosed on the neurological examination performed on the third post-traumatic day (Figures 1a and 1b). Hemorrhage was seen in the left ponto-cerebellar angle and prepontine cistern (Figure 2). Conservative treatment was maintained. On post-traumatic seventh day, the patient was fully conscious. However, bilateral abducens paralysis was still present. The patient was discharged on the 15th post-traumatic day.

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Figures 1a and 1b. Bilateral abducens paralysis is seen.

Figure 2. MRI shows hemorrhage in the left ponto-cerebellar angle and prepontine cistern.

No neurological deficit was observed at the time of discharge except bilateral abducens paralysis. On follow-up examination, performed 3 months after the trauma, the paralysis was found to have resolved on the right side whereas it was still present on the left side despite some improvement on the outward gaze of the eye globe.

Discussion

Bilateral abducens paralysis following trauma is a very rare pathology. Unilateral abducens paralysis usually follows fractures of the middle cranial fossa, as reported in a study by Antoniadou et al (2). Cervical hyperextension usually takes a role in the mechanism of bilateral abducens paralysis. Devos et al (3) reported a patient with bilateral abducens paralysis following neck trauma. In their study, it was found that although the patient had neck trauma, no fracture was observed on radiologic examinations. Arias (4) also reported a patient with bilateral abducens paralysis associated with

cervical vertebra fracture. In this study, contusion of the nerve and traction from the angle of the petrous bone were emphasized as injury mechanism (4).

In other studies, bilateral abducens paralysis developed in patients without any additional neurological deficit or any radiological finding after multiple trauma. In a report by Advani and Baumann (6), it was reported that neurological examination of a patient after trauma was completely normal except for bilateral abducens paralysis and all of the cranial and spinal radiological investigations were within normal limits. Similarly, Lahbabi et al (7) reported the occurrence of bilateral abducens paralysis after a minor trauma and no abnormalities were detected on radiological investigations.

Treatment of post-traumatic abducens paralysis is usually conservative. Hollis (5) observed that most of the cases with abducens paralysis improved within 6 months and accordingly, it is not recommended to intervene surgically until the end of this period (2). We have also applied a conservative approach to our patient and subsequently found a complete improvement in one globe and partial improvement in the other.

Niedermüller and colleagues (8) reported the occurrence of bilateral abducens paralysis in a patient after lumbar puncture. They suggested the mechanism of this bilateral abducens paralysis might be due to traction of the nerve following cerebrospinal fluid pressure drop after lumbar puncture.

In our case, post-traumatic bilateral abducens paralysis developed following hemorrhages in the ponto-cerebellar angle and prepontine cistern. We suggest that these hemorrhages might have resulted in supranuclear injury due to traction of the nerve following nuclear and pontine movement as a result of direct pressure. We have not come across the occurrence of bilateral abducens paralysis previously reported in the literature. We also recommend cranial MRI as an important diagnostic

tool. MRI should be performed in such patients because it is superior to CT in detecting subacute minimal contusion hemorrhages.

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