

Bilateral Gag Reflex Disability and Swallowing Disorder Following Traumatic Craniocervical Dislocation: A Case Report

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1. Abstract

1.1. Background: Traumatic Atlanta-occipital dislocation is common and appears to be associated with complications. These patients are either passengers in automobiles or pedestrians involved in motor vehicle accidents.

1.2. Case Report: We describe a 16-year-old man with bilateral gag reflex disability and swallowing disorder following traumatic Atlanta cervical dislocation that was characterized as bilateral gag reflex disability and swallowing disorder. It was found that it was caused by stretching of the lower cranial nerves. Treatment started with a halo vest and then occipitocervical fusion was surgically performed.

1.3. Conclusion: In conclusion, it is likely that the presence of atlantoaxial dislocation has damaged the swallowing centers and the gag reflex, so, occipito-cervical arthrodesis is the recommended treatment option.

2. Introduction

Traumatic Atlanta-occipital dislocation is common and appears to be associated with complications. These patients are either passengers in automobiles or pedestrians involved in motor vehicle accidents [1]. The gag reflex, known as the pharyngeal reflex, is

an essential component of evaluating the medullary brainstem and plays a role in the diagnosis of brain death [2]. Trauma to the cervical spine encompasses a wide spectrum of injury. Cervical dislocations have classically been associated with traumatic spinal cord injuries. These injuries can cause spinal cord compression and dramatic neurological deficits, and the severity of the injury is dependent upon multiple factors. These can include the force applied to cause the injury, the extent of damage to the stabilizing the osseous and soft tissue structures of the cervical spine, patient's age, syndromic issues, bone quality, and underlying patient comorbidities [3].

The cervical spine consists of seven vertebral bodies. C1 (atlas) articulates with the occiput and C2 (axis), which is considered the axial spine, and from C2-C7, which is considered the sub-axial spine. From C2-C7, the cervical spine has a resting lordotic curve. C1 and C2 form a unique set of articulations that provide a great degree of mobility for the skull. C1 serves as a ring or washer upon which the skull rests and articulates in a pivot joint with the dens or odontoid process of C2. Approximately 50% of flexion extension of the neck happens between the occiput and C1; 50% of the rotation of the neck happens between C1 and C2. The cervical spine is much more mobile than the thoracic or lumbar regions of

the spine. Unlike the other parts of the spine, the cervical spine has transverse foramina in each vertebra for the vertebral arteries that supply blood to the brain. In the setting of a traumatic event, the injured osseous and soft tissue structures determine the stability of the cervical spine and the treatment needed [4].

Cervical dislocations have a bimodal distribution, and the mechanism of injury varies depending on the patient's age. Younger patients are typically associated with a higher injury mechanism, such as a motor vehicle collision [3, 5]. Facet joint dislocations can be purely ligamentous or accompanied by fracture depending on the mechanism of injury. Facet dislocations are typically caused by a flexion-distraction event at the time of injury a located in the subaxial spine. Hyper flexion creates a distraction force that causes failure of the posterior osseous/ligamentous structures to fail in tension, and a rotation/shear force will cause fracture or dislocation [6]. Cervical dislocations can occur in two locations: axial, which consists of the occipitocervical (occiput/C1) and atlantoaxial articulation (C1/C2), and subaxial, which extends from C2/C3 to C7/T1. Acquired instability causing dislocations can occur in the axial spine and can be seen in the pediatric population. However, the majority of these dislocations are secondary to a traumatic event, and about 75% occur in the subaxial spine [3, 7]. Most sub axial dislocations are associated with males, and high energy mechanisms in younger patients, such as a motor vehicle collision [8].

Case report

A16-year-old patient who suffered multiple traumas following a car accident was admitted in our hospital in September 2018. The patient was alert upon arrival at the emergency room, describing chest pain and shortness of breath. There was no description of pain in the spine. In the past medical history, we found that his cleft palate had been operated when he was a child. Upon arrival, the patient's vital signs were stable (BP: 100/65 PR: 93 RR: 23, spontaneous respiration), and he had a Glasgow Coma Scale score of 15. He had no wounds or lesions on examination of the head and face. The pupils were normal in size and symmetrical. On examination of the cyanotic mucosa, he was not pale. On examination of the neck, JVP was normal, the trachea was in the midline, and there were no emphysema, hematoma, and tenderness of the cervical spine.

On chest examination, the movements were normal, symmetrical, and stable. On examination, both sides of the lung showed tenderness. On lung hearing, it had a coarse crackle. On cardiac hearing, it was normal and not muffled. Abdominal examination showed no trauma effects. BS hearing was audible. It was soft to the touch, had no rigidity, guarding, and tenderness. No tenderness was shown on examination of the pelvis and was stable. On examination of the perineum, there was no bleeding, hematoma, and ec-

chymosis. There was no obvious deformity in the examination of the organs; the distal pulses were symmetrical and tangible. CXR showed bilateral patchy infiltration in the lower right and middle lobes of the left lower lingual lobe. Negative FAST ultrasound report showed Chest CT scan infiltration in the above lobes, which suggests alveolar hemorrhage.

The patient was admitted in the ICU. Due to the lack of spinal tenderness and abnormal graphs and Brain CT, he was discharged from the neurosurgery service. He also underwent an endoscopy that reported a large wound in the distal esophagus. Therefore, the patient was re-consulted for neurosurgery due to the lack of gag reflex and history of trauma. CT scan of the distal occipital bone reported C3 vertebrae dislocation. The patient was initially fitted with a halo vest, and then occipitocervical fusion was performed.



Figure1: Standard postoperative radiograph of the occipito-cervical fusion: osteosynthesis using an occipital screwed plate and cervical hooks. A: lateral radiograph, B: A/P radiograph

3. Discussion & Conclusion:

In many patients, including our case, the presence of a head injury may make early demonstration of the neurological manifestations of this injury difficult. The presenting neurological lesions are directly related to Atlanta vertebral dislocation. Injuries affecting the brain stem, cranial nerves, upper spinal cord, and cervical roots are considered separately.

Therefore, the patient had atlantoaxial dislocation, which is likely to cause damage to the swallowing centers and the gag reflex, so by fixing the craniocervical junction, the problem was resolved, and the patient was recovered. Occipito-cervical arthrodesis is the recommended treatment option. Early recognition and standard appropriate management are essential to avoid delayed treatment and complications.

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