Clinical Case Report

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Traumatic posterior atlantooccipital dislocation with Jefferson and occipital condyle fractures

A case report

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Abstract

Rationale: To the best of our knowledge, this is the first report on a case of a traumatic posterior atlantooccipital dislocation (AOD) with 3-part Jefferson and occipital condyle fractures.

Patient concerns: We report the case of a 60-year-old male with posterior AOD with 3-part Jefferson fracture and fracture of right occipital condyle. This injury occurred as a result of rolling down from a mountain. The patient complained of severe neck pain showing bony tenderness and ecchymosis in the high cervical area but did not show any neurologic abnormalities.

Diagnoses: Reconstructed computed tomography scans clearly demonstrated a 3-part Jefferson fracture and fracture of right occipital condyle, and posteriorly displaced occiput with respect to the anterior arch of C1 and dens of C2.

Intervention: We planned to perform occipitocervical fusion; however, the patient refused treatment. He was transferred to another hospital and lost to follow-up.

Outcomes: Although extremely rare, patient who had posterior AOD with 3-part Jefferson and occipital condyle fractures can survive without neurological compromise, as was observed in our patient.

Lessons: Clinical suspicion with thorough radiographic and physical examinations are very important for diagnosing of the upper cervical spine injuries such as AOD with Jefferson and occipital condyle fractures.

Abbreviations: AOD = atlantooccipital dislocation, CT = computed tomography, MRI = magnetic resonance imaging.

Keywords: atlantooccipital dislocation, Jefferson fracture, occipital condyle fracture, upper cervical injury

1. Introduction

Atlantooccipital dislocation (AOD) is a rare injury that is generally fatal because its association with severe trauma and the potential to destabilize the craniocervical joint.[1–4] Prompt diagnosis and early surgical treatment is crucial to prevent further neurological deterioration, which may be associated with cervical spine instability.[5] However, initial diagnosis is often difficult to identify on plain radiographs, particularly in patients with multiple cervical spine injuries. Therefore, a clinical suspicion and careful examination of the upper cervical spine are the most important factors for diagnosing AOD.[1–5]

Very few cases of traumatic AOD with a Jefferson fracture have been reported.[1,6] Furthermore, no report exists on cases of traumatic AOD simultaneous Jefferson and occipital condyle fractures. This type of combined injury without neurological involvement has not yet been described in the literature.

2. Case report

A 60-year-old male complaining of severe posterior neck pain without loss of consciousness was admitted to the emergency room. He had multiple wounds on the chin and forehead caused by rolling down from a mountain. During admission, a physical examination revealed bony tenderness and ecchymosis in the high cervical area. A neurological examination revealed unremarkable findings, with a Glasgow Coma Scale score of 15. He was made to wear a hard collar brace to obtain cervical spine radiographs.

Plain radiographs of the cervical spine revealed a prevertebral soft tissue swelling. The basion was not aligned with the tip of the dens, and a posterior displacement of the basion with respect to the tip of the dens was observed (Fig. 1A). Sagittal reconstructed computed tomography (CT) scan showed increased anterior soft tissue swelling and running of the Wackenheim line behind the dens (Fig. 1B) and coronal and sagittal reconstructed CT scans showed linear fracture of right occipital condyle (Fig. 1C and D). Coronal reconstructed CT scans revealed a lateral subluxation of

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This retrospective study was approved by the Institutional Review Board of the Uijeongbu St. Mary's Hospital (e-IRB UC18RES10007) and informed written consent was obtained from the patient for publication of this case report and accompanying images.

The authors have no conflicts of interest to disclose.

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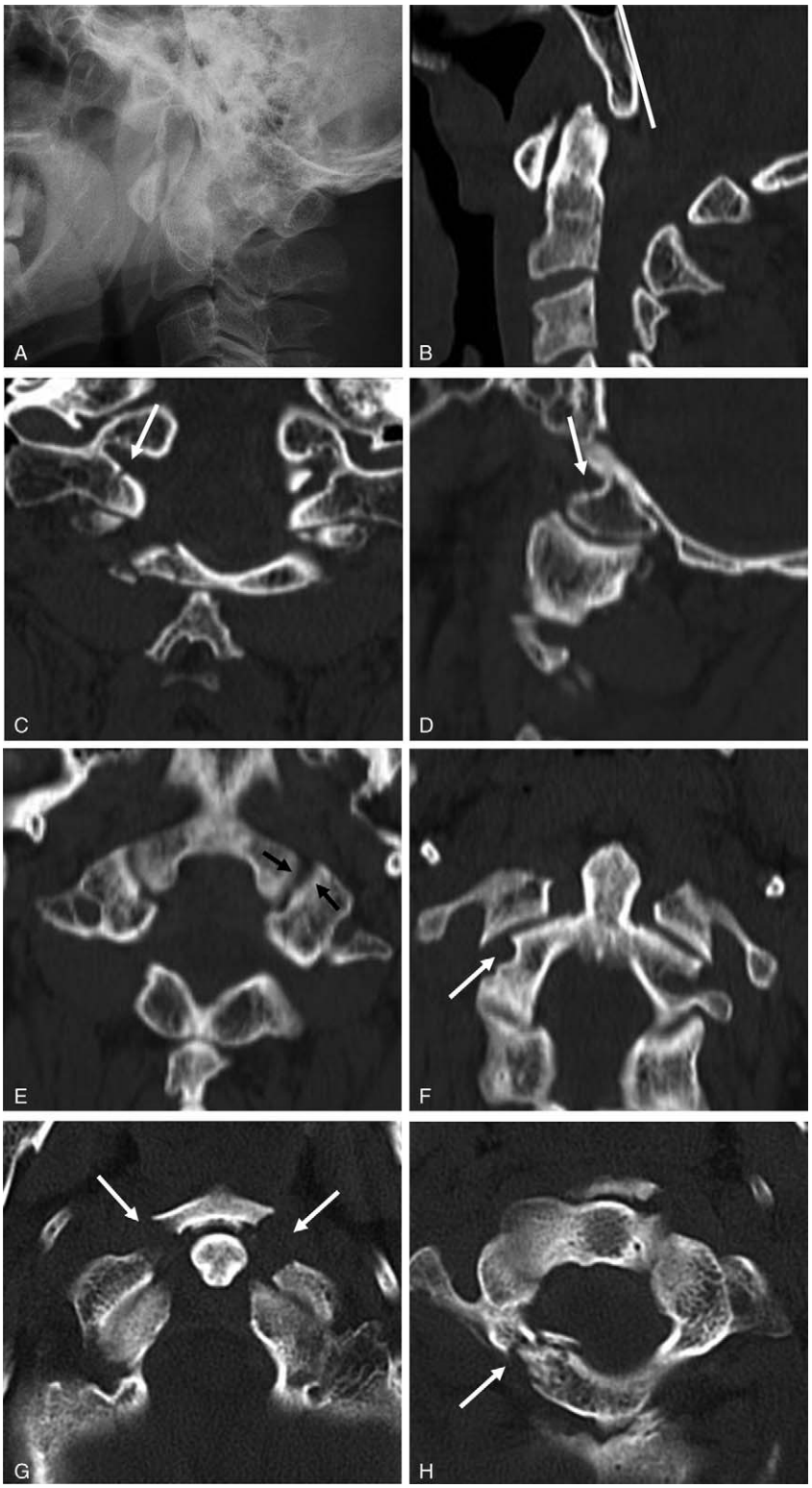

Figure 1. Case illustration of posterior atlantoaxial dislocation with Jefferson fracture and occipital condyle fracture. Lateral radiograph of cervical spine (A) and sagittal reconstructed CT scan (B) showing increased anterior soft tissue swelling and running of the Wackenheim line (white line) behind the dens. Coronal (C) and sagittal (D) reconstructed CT scans showing linear fracture of right occipital condyle (white arrow). Coronal (E and F) reconstructed CT scans showing widening of occpitoatlantal joint (black arrows) and lateral displacement of C1 lateral mass (white arrow). Axial (1 g and 1 h) CT scans showing 3-part Jefferson fracture (white arrows). CT = computed tomography.

C1 lateral mass with respect to dens and an asymmetry between the atlas transverse process and the styloid process showing widening of occpitoatlantal joint and lateral displacement of C1 lateral mass (Fig. 1E and F). Axial CT scans revealed a 3-part Jefferson fracture (both anterior and posterior arch) (Fig. 1G and H).

We planned to perform occipitocervical fusion; however, the patient refused treatment. He was then transferred to another hospital, which was near his home, and was lost to follow-up.

3. Discussion

This case reports a traumatic AOD and its association with Jefferson and occipital condyle fractures.[7–12] AOD is commonly associated with upper cervical injuries,[3,9] which occurs as an isolated injury or as a combined trauma. Traumatic AOD results from an injury of ligamentous structures to the craniocervical junction and is associated with a high rate of mortality and severe neurological deficits.[1–4] Delayed diagnosis is generally devastating; however, an accurate diagnosis is not always established during the initial physical evaluation. Various causes of missed diagnosis, including low clinical suspicion, presence of severe poly-trauma, and difficult radiographic evaluation of the craniocervical junction, have been reported.[1–5]

AOD may be accompanied by additional injuries, which simultaneously represent warning signs, including an intracranial hemorrhage particularly close to the craniocervical junction, a mandible fracture, and submental and chin lacerations, as symptoms of the hyperextension injury.[9,13] The associated injuries of the upper cervical spine include Jefferson,[1] occipital condyle, and C2 dens fractures.[14,15] Patients who arrive at the emergency room with intact or incomplete neurological status may exhibit a possible risk of delayed injury as they may initially be misdiagnosed due to minimal or no deficit but later develop a delayed deterioration of neurological compromise due to increased instability.[16,17] The progression of neurological complications can reflect the high degree of instability of these lesions, even if radiographic findings are inconclusive.

An accurate diagnosis of AOD using plain radiographs is very difficult because of the peculiar anatomy and bony overlap of the upper cervical spine. CT is essential to confirm AOD when it is suspected using plain radiographs or clinically. In addition, magnetic resonance imaging (MRI) could accurately demonstrate the ligamentous injuries of the upper cervical spine, which may be related to the occurrence of AOD.[1–5] Therefore, CT or MRI should be performed if plain radiographs and the Harris method suggest AOD, particularly in the presence of prevertebral soft tissue edema on radiographs or in the presence of a clinical suspicion in the physical examination.[18,19]

The treatment of choice for AOD is a posterior occipitocervical fusion,[20] because achieving complete ligamentous healing is difficult and the ligamentous character of the injury can lead to chronic subluxation.[1–5,21–24] Because of the high risk of potential complications, the authors could not perform halo traction during the initial management of AOD. Once the patient's overall condition is established, surgical stabilization is recommended.[16]

To the best of our knowledge, this is the first report on a case of a traumatic posterior AOD with Jefferson and occipital condyle fractures. Although extremely rare, patient who had posterior AOD with Jefferson and occipital condyle fractures can survive without neurological compromise, as was observed in our patient.

Clinical suspicion with thorough radiographic and physical examinations is very important for diagnosing of the upper cervical spine injuries such as AOD with Jefferson and occipital condyle fractures.

Author contributions

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