

Traumatic Occipital Condylar Fracture - A Case Report -

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Occipital condylar fracture (OCF) is a rare disease entity that can not be easily diagnosed. Since it is hard to diagnose OCF by routine skull and cervical plain radiological evaluation, sophisticated studies such as an isotope bone scan and craniocervical junction computed tomography (CT) should be considered. We describe a patient of the occipital condylar fracture who presented with mild neck pain without any neurologic deficits and abnormality of high cervical area by plain X-rays. The clinical and radiological evaluation and treatment of this lesion is discussed.

Key Words: Occipital condyle fracture · Cervical spine injury · Severe head trauma



INTRODUCTION

Occipital condylar fracture (OCF) is a rare injury. However, their incidence is underestimated for two reasons: Firstly, routine X-rays of the cervical spine have been shown to be false-negative in most cases and clinical presentation is non-specific. Secondly, OCF occurs most frequently in patients with high-energy cranial trauma^{2,5,8,9,12,14}. In these intubated patients there is no specific clinical sign of OCF. OCFs were first described by Sir Charles Bell in 1817 on the basis of a postmortem examination²². OCFs have recently been considered as an underdiagnosed condition that likely occurs with greater frequency than generally accepted. OCFs are increasingly diagnosed in survivors of high-energy injuries because of the widespread use of CT scans⁵. As indicated by the classification system proposed by Anderson and Montesano², three types of OCF can be distinguished according to morphology, patient anatomy and biomechanics. Here we describe one patient with a traumatic OCF.

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CASE REPORT

A 27-year-old male patient was admitted to our emergency room (ER) after a traffic accident. On admission, he showed a deep stuporous mental state, and had to be intubated. Brain CT taken at the ER revealed traumatic intracerebral hematoma on the left frontal area. Stereotactic aspiration was performed as emergency basis. He maintained a deep drowsy mental state for one month post operatively. Then, he woke up to a drowsy mental state and brain CT taken at that time revealed almost stabilization of initial craniocerebral injury. During that time, the patient complained of vague posterior upper neck pain, but routine X-ray findings of cervical spine were considered normal. He was neurologically intact. ^{99m}Tc whole body bone scan showed a hot-uptake on the right arch of C1 (Fig. 1). Then he undertook a thin-slice CT scan of the cranio-cervical region with coronal, sagittal and 3D reconstruction. CT scan showed a right-sided occipital condyle fracture with a fragment displaced medially from the infra-medial aspect of the occipital condyle into the foramen magnum which was OCF type III according to the Anderson and Montesano classification (Fig. 2). So he was treated with halo-vest brace immobilization for 12 weeks. CT scan at 12 weeks follow-up revealed that there was incomplete union of OCF (Fig. 3).

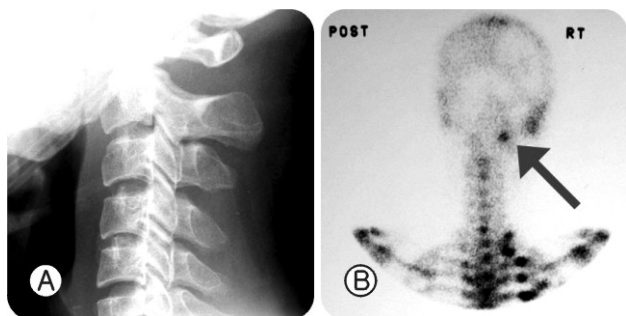


Fig. 1. (A) Simple X-ray of c-spine lateral view and (B) whole body bone scan image. (A) No definite fracture line is seen but (B) hot uptake (arrow) of the C1 portion is noted.

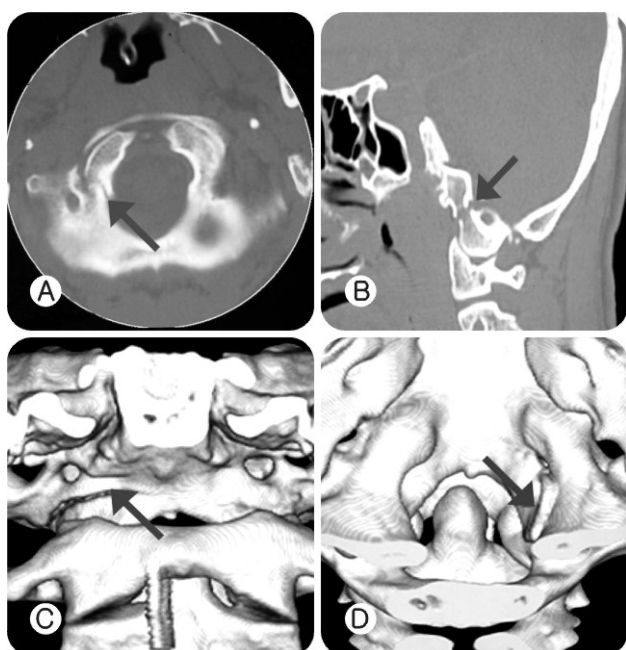


Fig. 2. Initial occipital condylar fracture image on computed tomography. (A) Axial, (B) sagittal reconstruction and (C) 3D reconstruction CT AP and (D) internal right medial view CT scans show an avulsion fracture (arrows) of the inferomedial aspect of the right occipital condyle.

After removal of halo-vest, Philadelphia collar applied following 12 weeks. Follow-up CT scan was done at 12 weeks interval for twice with Philadelphia collar. There showed improved but not complete bony union of OCF with last follow-up 36 weeks after application of halo-vest cervical brace, and he was functioning independently without neurologic deficit without cervical orthosis.

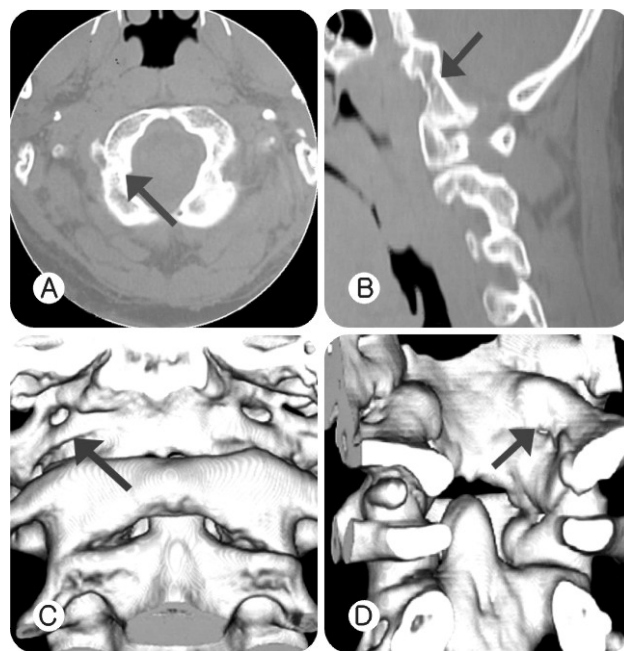


Fig. 3. Follow up occipital condylar fracture image after application halo-vest for 12 weeks. (A) Axial, (B) sagittal reconstruction and (C) 3D reconstruction CT AP and (D) internal right medial views CT scans show decreased displacement (arrows) of right occipital condyle.



DISCUSSION

OCF is a rare injury. Clinical diagnosis of OCF can be delayed even in an alert patient, where the occipito-cervical pain on the side of the OCF is often masked by the "non-specific" neck pain associated with the head and neck trauma. Moreover, there is a difficulty in diagnosing intubated patients due to the inability of complaining of any clinical symptoms^{6,19,20}.

From review of literature, 11 cases were described between 1817 and 1974, and after the advent of the CT scan 225 were diagnosed up to 1999^{16,19}. Indeed, the real incidence of OCF in surviving patients remains unquantified. In a post-mortem evaluation of victims of motor vehicle accidents, Alker et al.¹⁾ revealed an incidence of OCF of 0.68%. Other studies revealed incidence of 8 to 16%^{4,15}.

The clinical presentation of patients with an OCF is highly variable, ranging from mild neck pain to severe neurological sign such as quadriplegia⁶. Diagnosing associated brainstem and

vascular lesions are rare in high-energy fatal cases. In a prior study, 31% of OCF presented with lower cranial nerve deficit with the hypoglossal nerve most commonly involved²⁰⁾.

Because of the high variability in clinical presentation, as well as the lack of specificity of signs and symptoms, choice of diagnostic imaging is essential for the diagnosis of OCF. Skull and cervical spine plain radiographs obtained routinely in patients with multiple trauma generally does not show any abnormality. The cranio-cervical junction CT scan with bony windows is the recommended method of choice. This should be performed in patients with high-energy trauma to the head or cervical spine with unexplained persistent upper neck pain, lower cranial nerve palsies and/or fractures of C1 or C2.

Anderson and Montesano²⁾ described three categories of OCF. Type I is described as an impacted condyle with comminution and minimal or no displacement of the fragment into the foramen magnum. The mechanism of injury is axial loading of the skull, analogous to a Jefferson fracture. It is felt to be a stable entity because the tectorial membrane and contralateral alar ligament are intact. Type II is described as a basilar skull fracture with extension into the occipital condyle. It is not associated with displacement into the foramen magnum. The alar ligament and tectorial membrane are intact. The mechanism of injury is secondary insult to a direct blow to skull. Type III is characterized as an avulsion fracture of the occipital condyle secondary to stress on the ipsilateral alar ligament. Severe rotation or lateral bending (or both) causes avulsion of the occipital condyle by the alar ligament^{2,10,11,17,18)}. According to this classification, our case was a type III OCF (Fig. 2).

The treatment of OCF remains controversial. Generally, type I and type II fractures can be treated with a Philadelphia collar, because they are stable. Type III fractures should be treated with a more rigid external orthosis, such as a halo-vest. This is potentially unstable due to disruption of the alar ligaments^{2,3,10,13,18)}. And follow-up high-resolution CT scan is recommended at 10 to 12 weeks after injury in order to healing of the fracture^{2,7,21)}. Surgical treatment of OCF is controversial. Bozboga et al.²⁾ described the patient with OCF that was treated with surgical decompression. The treatment of this case was successful initially, improving the neurological status of the patient. However, the patient subsequently deteriorated. Whether the patient would

have done well with or without surgical intervention is unclear, since the initial improvement after surgery was short lived. Even when brain stem compression is present, most authors recommend conservative management. We treated our case with a halo-vest and a Philadelphia collar device for 36 weeks. Then, follow-up CT revealed more stabilization and progressive union of OCF.



CONCLUSION

We reported one case of the type III OCF without neurologic deficit and treated with halo-vest for 12 weeks and Philadelphia collar for following 24 weeks. Thirty six weeks after application of orthosis, there showed more stabilization with progressive union of OCF but, incomplete union of OCF was seen without any neurologic deficit.



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