

Old and Neglected Odontoid Fracture with C1-C2 Dislocation: An Approach

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ABSTRACT

In Indian health setup with short of précised expertize, the nonunion with C1-C2 instability of odontoid fractures usually results from delayed diagnosis and its inappropriate treatment. Our patient had kyphotic deformities at the C1-C2 joint complex secondary to neglected odontoid fractures. Patient was asymptomatic for a long period of time before appearance of symptoms, neck pain and instability, despite being obvious subluxation and kyphotic deformities at C1-C2 joint complex. The reactive new bone formation around the odontoid fracture plays a chief role in preventing further movement and development of myelopathy or instability. However, the treatment options available for neglected odontoid fractures remain controversial. Patient was operated by us without posterior C1 decompression, occipital-to-C2 fusion and spinal instrumentation with two lateral mass screws.

Keywords: Atlantoaxial joint, Bone, Dislocations, Fractures, Odontoid process.

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INTRODUCTION

The odontoid fracture is a common type of fracture, accounts for approximately 10 to 20% of all cervical spine fractures.¹⁻³ Most odontoid fractures are unstable, Anderson and D'Alonzo type II being most common⁴ that leads to necrosis and nonunion because of instability and the poor blood supply of the odontoid process.²⁻⁴ Traumatic atlanto-occipital dislocation is a mortal injury. It is the cause of death in 8 to 35% of traffic fatalities and in up to 10% of fatal cervical spine injuries.⁵⁻⁷ Early in diagnosis, immediate on spot adequate immobilization, intubation, monitoring and early reduction and plan internal fixation are the key to

survival. Atlanto-occipital dislocation represents instability in the craniovertebral structures. Subsequent C1-C2 instability or dislocation can lead to cervical spinal cord injury. We report a case of 20-year-old man with atlanto-occipital dislocation after a traffic accident.

CASE REPORT

A 20-year-old male presented with history of neck pain, vertigo, neglected neck injury, with generalized weakness in all four limbs, florid myelopathic signs, with intact bowel bladder since 6 months. He was hospitalized after trauma and intubated with spinal shock. He was unconscious for about 14 days, and then was referred to higher center for further management; within 3 months of trauma, patient started regaining flickering movements in extremities, which gradually increased in intensity. Patient now started walking with support of some aid; in the meanwhile patient had episodes of vertigo followed by unstable neck, presenting with drooping neck forward for which he used hard collar for the support. On cervical spine radiographs, malunited odontoid fracture along with C1-C2 subluxation was seen. The atlantoaxial interval was 10 mm and dural sac was 10 mm. The C1 arch had moved forward, with an angular flexion deformity of 30°. The entire cervical spine showed osteopenia, with marked compensatory lordosis. Bone formation bridging the anterior arch of C1 was noted (Fig. 1). Dynamic radiographs showed movement between C1-C2, indicating an unstable deformity (Fig. 1). Magnetic resonance imaging (MRI) showed compression of the spinal cord with myelomalacia at C1 level (Figs 2 and 3A and B). He underwent occipital-to-C2 fusion and spinal instrumentation with two lateral mass screws (Fig. 4). After 1 year of follow-up, there was progressive improvement in his neurological symptoms, neck pain with no C1-C2 displacement and patient was able to perform day-to-day activities. However, range of movements of neck was markedly reduced.

DISCUSSION

Most patients with an atlanto-occipital dislocation are either immediately dead or survive only for few hours^{6,7} although survivals had been reported.⁸⁻¹⁵ The odontoid process is an important structure for the stability of the C1-C2 joint, and odontoid fractures that do not receive

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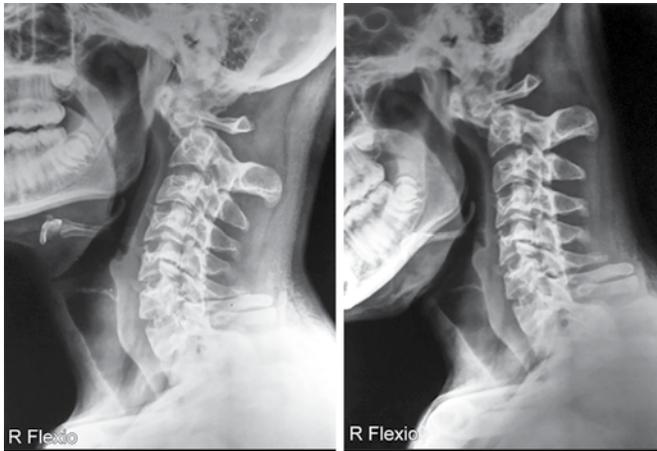


Fig. 1: Radiograph of the cervical spine showing the malunited odontoid fracture with C1-C2 subluxation. The C1 arch had moved forward creating an angular flexion deformity of 30°. Osteopenia of the entire cervical spine with marked compensatory lordosis is noted, with bone formation bridging the anterior arch of C1

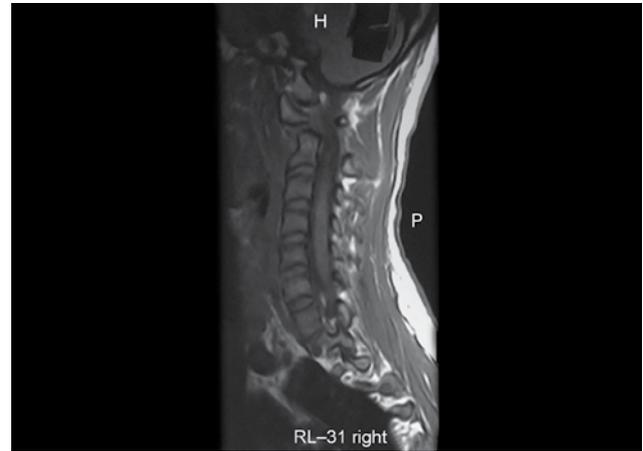
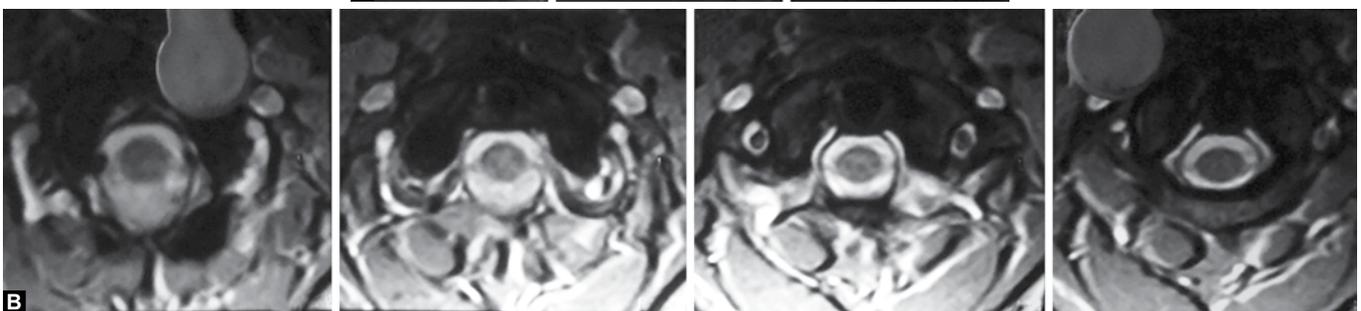
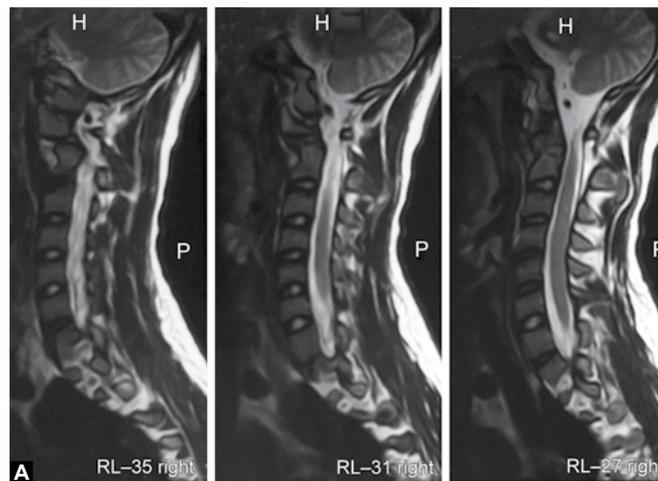


Fig. 2: T1-weighted image fracture with anterior angulation of dens noted with dislocation noted at atlantoaxial joint. C1 vertebra is displaced anteriorly in relation to C2 vertebra with reduced cervical canal dimension at level of C1 vertebrae



Figs 3A and B: Reduced thickness of cord noted with hyperintense signal on T2 in cord at level C1 vertebra-myelomalacia

timely and appropriate treatment lead to nonunion of fibrous union or to old neglected odontoid fractures, resulting in cervical spinal cord compression with instability. Nonsurgical treatments are usually considered first for type I and some time in type III odontoid fractures, and surgery is considered for patients with C1-C2 instability. However, the type II fracture with improving neurological status requires to treat the instability by posterior bridge fixation without decompression of C1 arch. Fixation gives stability and good amount of reduction, which increases the canal diameter and as a result patient may come in future with complete recovery of neurologic status.

Conservative treatment of type II fractures might lead to nonunion, even with halo brace fixation, and the fracture healing rate is reported to be low. Nonsurgical techniques alone have been successful in children, but have failed in adults especially in unstable spine. Thus, open reduction and internal fixation seem to be the only definitive treatment for adult patients with atlanto-occipital dislocation.^{2,4}

According to our review, neglected odontoid fractures should be managed individually, depending on patient's age, medical condition, severity of myelopathy, stability of the C1-C2 articulation and physical need. The C1-C2 joint complex and neurological status should be routinely



Fig. 4 : Occipital-to-C2 fusion and spinal instrumentation with two lateral mass screws

assessed, which determines the goal of surgical treatment on instability not decompression, because treatment should be focused on clinical and radiological findings rather than MRI reporting.

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