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Atlantoaxial Dislocation on Os Odontoideum Complicated by Dural Breach and Cervical Myelopathy in an Adolescent: A Case Report

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ABSTRACT

Os odontoideum is a rare anomaly of the odontoid process that may predispose to atlantoaxial instability and neurological complications. We report the case of a 16-year-old patient with a history of cervical trauma two years earlier, presenting with progressive upper limb paresis. Cervical MRI and CT imaging demonstrated C1–C2 dislocation on underlying os odontoideum complicated by dural breach and signs of cervical spinal cord suffering. This case highlights the importance of imaging in diagnosing delayed complications of atlantoaxial instability associated with os odontoideum.

KEYWORDS :

Os odontoideum, Atlantoaxial dislocation, Cervical myelopathy, Dural breach, Cervical trauma.

MAIN ARTICLE

INTRODUCTION

Os odontoideum is an uncommon anatomical anomaly characterized by separation of the odontoid process from the body of the axis. Although it may remain asymptomatic, it can lead to atlantoaxial instability with potentially severe neurological consequences.

Minor cervical trauma may precipitate spinal cord compression in predisposed patients. Magnetic resonance imaging (MRI) and computed tomography (CT) are essential for evaluating instability, ligamentous injury, and spinal cord involvement [1,2].

CLINICAL PRESENTATION

A 16-year-old male patient presented with progressive paresis of the upper limb associated with chronic cervical pain.

The patient reported a history of cervical trauma occurring two years earlier during a sports accident, initially considered minor and managed conservatively. Progressive neurological symptoms appeared several months later.

Neurological examination revealed:

- Decreased motor strength in the upper limb
- Hyperreflexia
- Cervical stiffness

Imaging Findings

CT Findings

Cervical CT demonstrated:

- Congenital os odontoideum separated from the body of C2
- Atlantoaxial (C1–C2) dislocation with abnormal widening of the atlanto-dens interval
- Signs of chronic instability at the craniovertebral junction

MRI Findings

Cervical MRI demonstrated:

- C1–C2 dislocation on underlying os odontoideum
- Posterior dural breach at the craniovertebral junction
- Cervical spinal cord compression with intramedullary T2 hypersignal consistent with myelopathy
- Ligamentous injury surrounding the atlantoaxial complex
- No epidural hematoma

These findings were consistent with chronic atlantoaxial instability complicated by spinal cord suffering.

DISCUSSION

Os odontoideum is characterized by an independent ossicle with smooth cortical margins separated from the odontoid process. Its etiology remains debated and may be congenital or post-traumatic.

This anomaly predisposes to excessive mobility between C1 and C2, increasing the risk of:

- Atlantoaxial instability
- Spinal cord compression
- Vertebral artery injury
- Chronic cervical myelopathy

Clinical Presentation

Clinical manifestations vary from asymptomatic forms to severe neurological impairment.

Common symptoms include:

- Neck pain
- Limited cervical mobility
- Motor weakness
- Sensory deficits

- Progressive myelopathy

In this case, delayed neurological deterioration occurred after previous cervical trauma [2].

Radiological Features [3]

CT is optimal for evaluating osseous anatomy and atlantoaxial alignment, whereas MRI assesses:

- Spinal cord injury
- Ligamentous disruption
- Dural involvement
- Myelomalacia

Characteristic imaging findings include:

- Detached odontoid ossicle
- Increased atlanto-dens interval
- Cervicomedullary compression
- Intramedullary T2 hypersignal

Differential Diagnosis

Differential diagnoses include:

- Odontoid fracture nonunion
- Congenital odontoid hypoplasia
- Atlantoaxial rotatory fixation
- Rheumatoid atlantoaxial instability

MRI findings are generally characteristic and allow confident diagnosis [3, 4].

Management

Management depends on neurological status and degree of instability.

Treatment options include:

- Cervical immobilization
- Posterior C1–C2 fusion
- Surgical decompression in cases of spinal cord compression

Early surgical stabilization is generally recommended in symptomatic patients to prevent irreversible neurological damage [3,5].

CONCLUSION

This case illustrates a delayed presentation of atlantoaxial instability related to os odontoideum in an adolescent with prior cervical trauma. MRI and CT demonstrated C1–C2 dislocation complicated by dural breach and cervical spinal cord suffering. Early recognition of this rare entity is essential because delayed diagnosis may result in permanent neurological deficits.

FIGURES

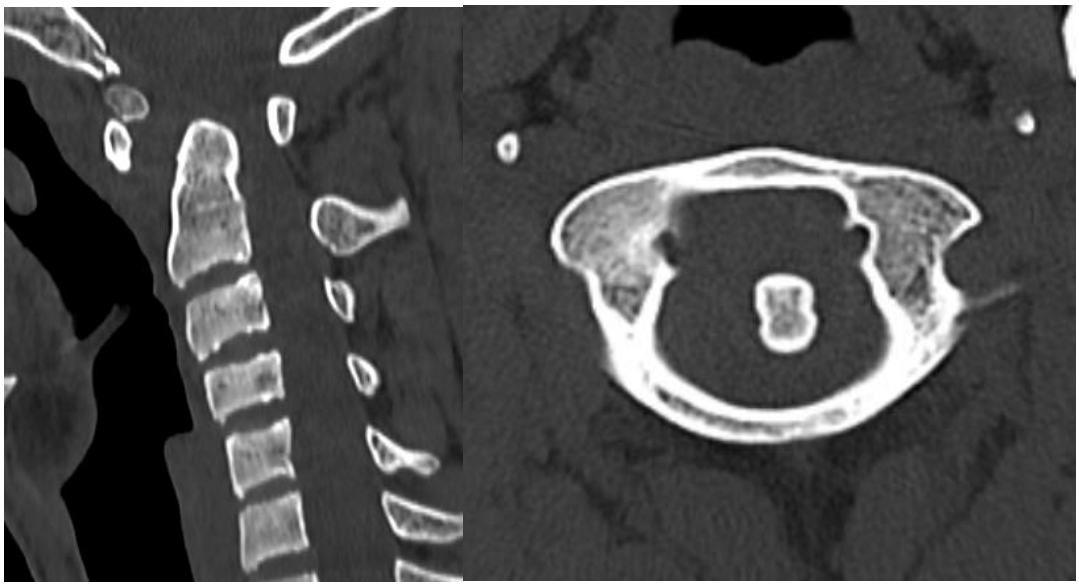

Figure 1: Sagittal and axial cervical CT image demonstrating os odontoideum with atlantoaxial dislocation.

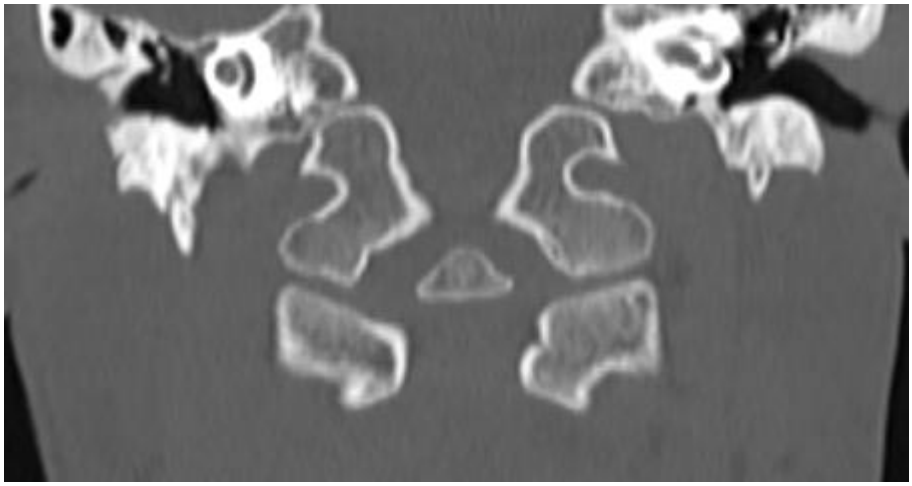

Figure 2: Coronal CT reconstruction showing abnormal alignment between C1 and C2.

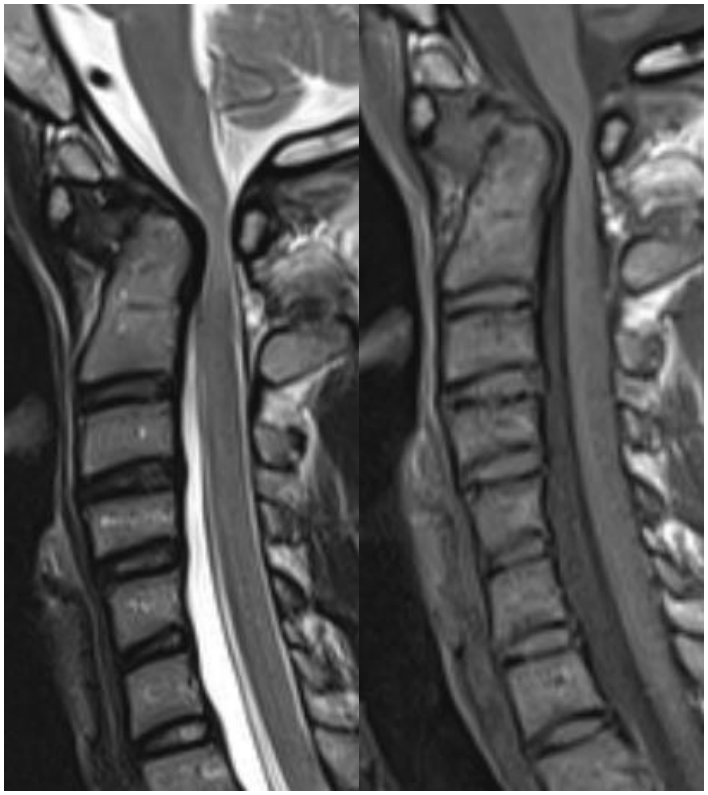

Figure 3: Sagittal T2 and T1-weighted MRI demonstrating spinal cord compression with intramedullary hypersignal at the craniovertebral junction.

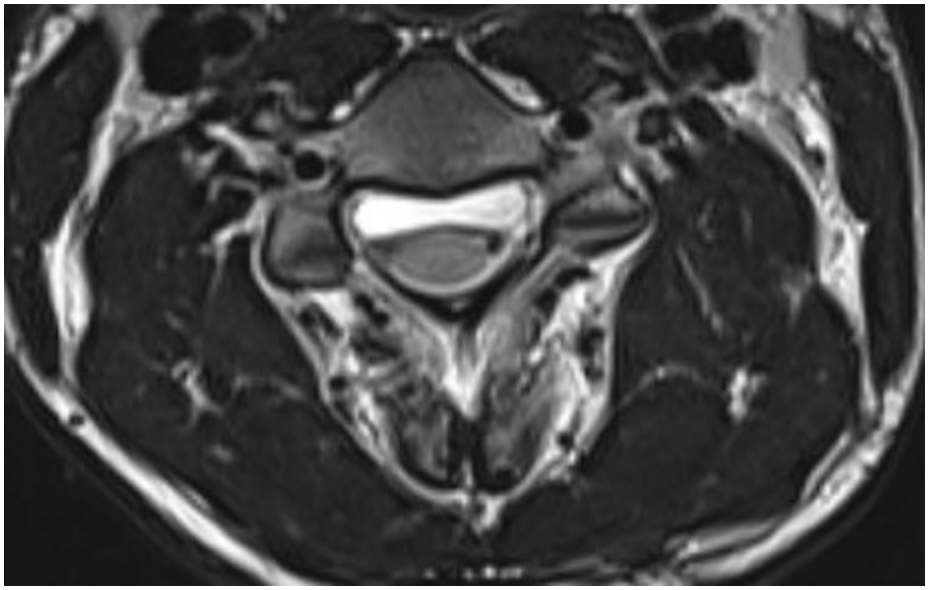

Figure 4 : Axial T2-weighted MRI image illustrating dural breach and compression of the cervical spinal cord.

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