Open Access Original Research Article

MedPeer Publisher
Abbreviated Key Title: MedPeer
ISSN : 3066-2737
homepage: https://www.medpeerpublishers.com

Post-Diving Cervical Neuralgia Revealing a Stable Type II Odontoid Fracture

DOI: 10.70780/medpeer.000QGRI

AUTHORS AND AFFILIATION

Soukaina BAHHA[1], Asmae Guennouni[1] , Salma El AOUADI[1], Sarah Loubaris[1], AMAL LAHFIDI[1], MOHAMMED JIDDANE[1].

[1] Radiology Department, Hospital of Specialties

Corresponding author: Soukaina BAHHA

ABSTRACT

Cervical neuralgia is a rare but significant condition that can arise following diving, often resulting from trauma to the cervical spine. We present the case of a patient who developed post-diving cervical neuralgia, which was later found to be associated with a Type II odontoid fracture. Typically, Type II odontoid fractures are considered unstable and require surgical intervention due to the risk of neurological impairment. However, in our patient, the fracture remained stable throughout the clinical course, despite the usual association with instability. This case highlights the exceptional stability of a Type II odontoid fracture in the context of cervical neuralgia following diving, suggesting that some fractures may exhibit atypical behavior and do not always follow the expected patterns of instability.

KEYWORDS :

Cervical neuralgia; odontoid fracture; diving injury; cervical spine trauma; CT scan; MRI; conservative treatment

MAIN ARTICLE

INTRODUCTION:

Diving activities pose a risk of cervical spine injury, often due to hyperflexion or axial loading during water entry [1]. Odontoid fractures represent a significant portion of cervical fractures and may present subtly, especially when non-displaced and stable [2]. Recognizing such injuries early is crucial to prevent neurological complications. This report describes a stable Type II odontoid fracture revealed by cervical neuralgia post-diving in a young female patient.

CASE REPORT:

An 18-year-old female presented with cervical neuralgia following a recreational diving session. The onset of pain was immediate and localized to the cervical region, with no radiation to other areas. The patient reported the pain as persistent and sharp. Neurological examination revealed no deficits in motor or sensory function; however, there was mild tenderness upon cervical spine mobilization, suggesting a soft tissue injury or minor vertebral involvement. To assess the injury, a cervical CT scan was performed, which revealed a non-displaced fracture of the odontoid base, classified as Type II according to the Anderson and D'Alonzo classification (Figure 1) [3]. Given the potential for associated spinal cord injury or ligamentous damage, an MRI was obtained to further evaluate the injury. The MRI confirmed the presence of the fracture, but it showed no evidence of spinal cord compression or associated ligamentous injury, ruling out more severe spinal involvement (Figure 2). The patient was initially managed conservatively with analgesics and cervical immobilization using a soft cervical collar for a period of 3 months. This approach aimed to provide pain relief, limit further movement of the cervical spine, and promote natural healing. At a follow-up appointment 5 months post-injury, a repeat CT scan revealed a stable fracture with signs of delayed healing, but without any secondary displacement (Figure 3). The patient reported significant pain relief and had no neurological symptoms or further complications.

DISCUSSION :

Odontoid fractures account for a significant proportion of cervical spine injuries and are often associated with hyperflexion or axial loading mechanisms, commonly observed in diving accidents [1][2] . These fractures can be classified into three types, with Type II fractures—located at the base of the odontoid process—being considered the most unstable. This instability is linked to a higher risk of non-union, making it a critical concern in the management of these fractures[3] . In the present case, the fracture was classified as Type II

but was non-displaced and stable, thus allowing for conservative management with a cervical collar.

Imaging plays a critical role in diagnosing cervical spine injuries, particularly in cases where subtle trauma, such as post-diving cervical neuralgia, may mask underlying structural damage. In our case, imaging modalities such as MRI and CT were essential in identifying the stable Type II odontoid fracture and ruling out other potential causes of neuralgia. Cervical spine radiographs typically include lateral, antero-posterior, and open-mouth views to assess the fracture[3].Computed tomography (CT) imaging of the cervical spine provides superior resolution of bony structures, facilitating precise identification and characterization of odontoid fractures. It also helps detect anatomical anomalies, such as defects in the posterior arch of C1, which may influence treatment decisions. [4] Additionally, CT angiography is indicated when the fracture extends near vascular areas, allowing for evaluation of the vertebral artery path during posterior fixation[5]. Magnetic resonance imaging (MRI) is used to assess the integrity of the transverse ligament and spinal cord, particularly in patients presenting with neurological deficits [6].

The Anderson and D'Alonzo classification is the most widely used system for categorizing odontoid fractures of C2. It classifies these fractures into three types based on their anatomical location (Figure 4).

- Type I involves a fracture at the tip of the odontoid, which is usually stable. However, instability may be suspected, especially in cases of alar ligament avulsion, requiring dynamic radiographs.
- Type II affects the neck of the odontoid and is often unstable[7].
- Type III extends into the body of C2[8].

The primary goal of treatment is to ensure fracture stability [9]. Fibrous consolidation often provides adequate stability. In the absence of instability observed on flexion/extension radiographs or ligamentous injury detected by MRI, external immobilization with a rigid collar or halo vest can promote fracture healing, which typically occurs within 12 weeks[3].

CONCLUSION :

This case illustrates that stable Type II odontoid fractures may present with isolated cervical neuralgia post-diving. Early imaging with CT and MRI is essential for accurate diagnosis and assessment. Conservative management with cervical immobilization can lead to satisfactory outcomes in the absence of displacement or neurological deficits.

FIGURES

Figure 1 : Cervical CT scan (sagittal view) showing a non-displaced Type II odontoid fracture (arrow)

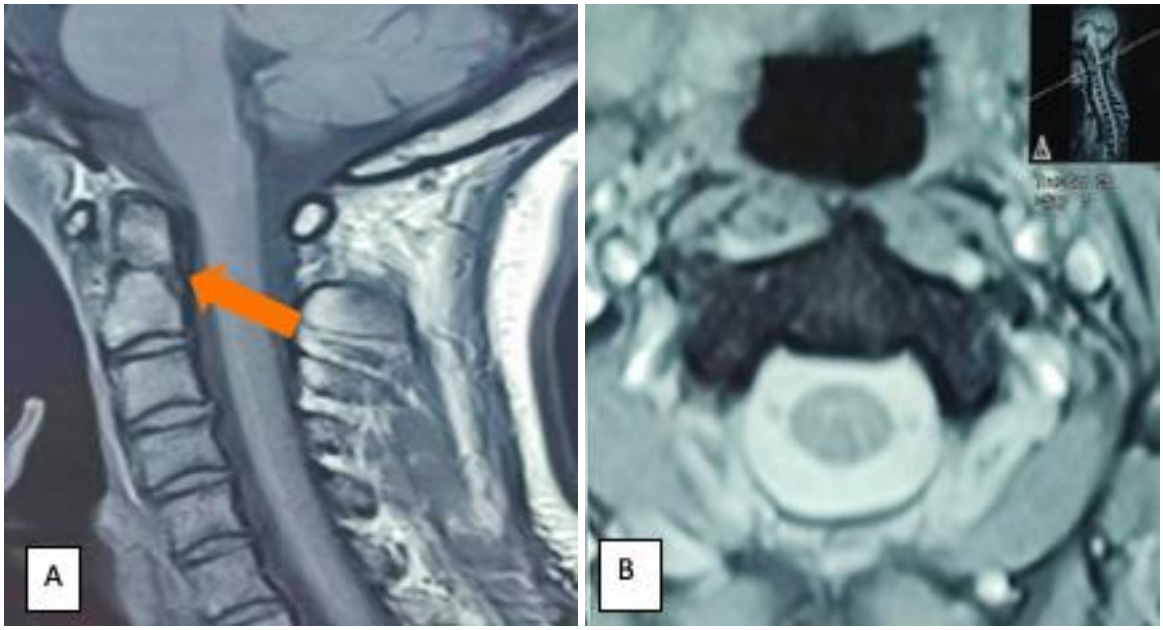

Figure 2: Cervical MRI (T1-weighted sagittal (A) and axial (B) views) confirming the fracture (arrow) with no spinal cord compression.

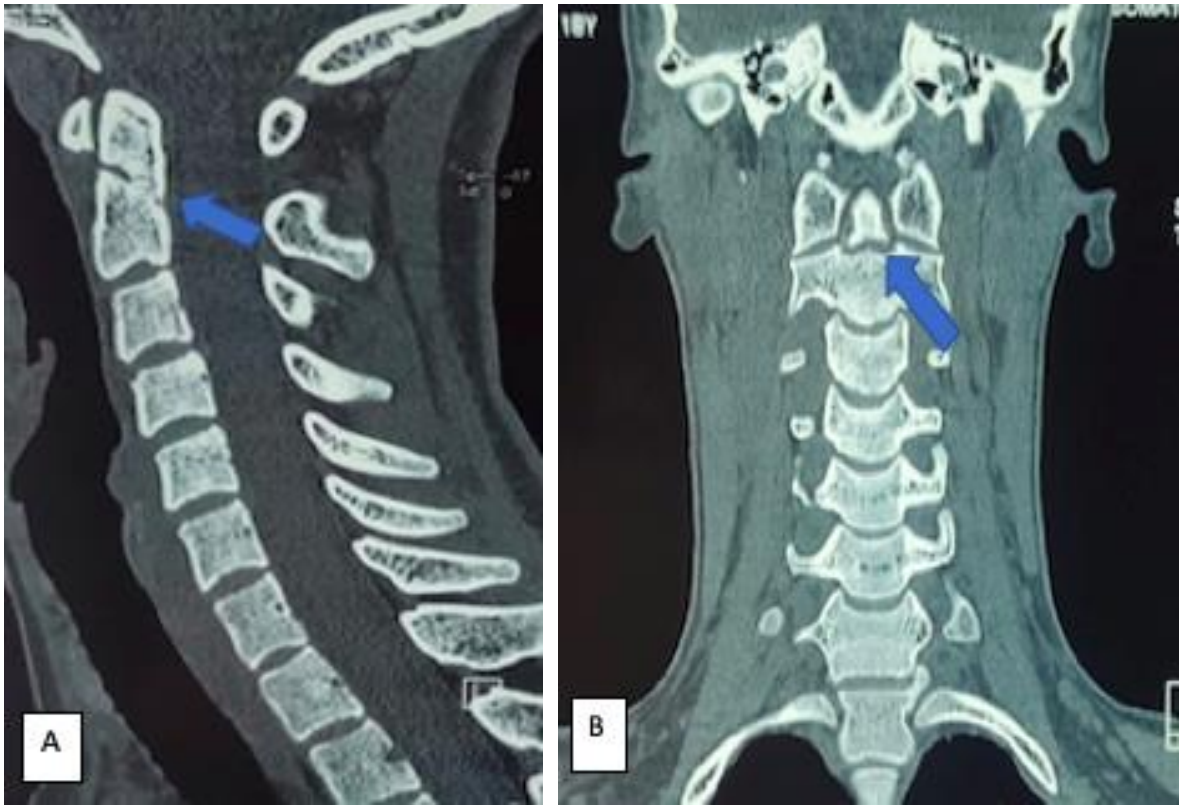

Figure 3 : Follow-up CT scan at 5 months in sagittal (A) and coronal (B) slices showing no displacement of the fracture line of the odontoid process (Blue arrow).

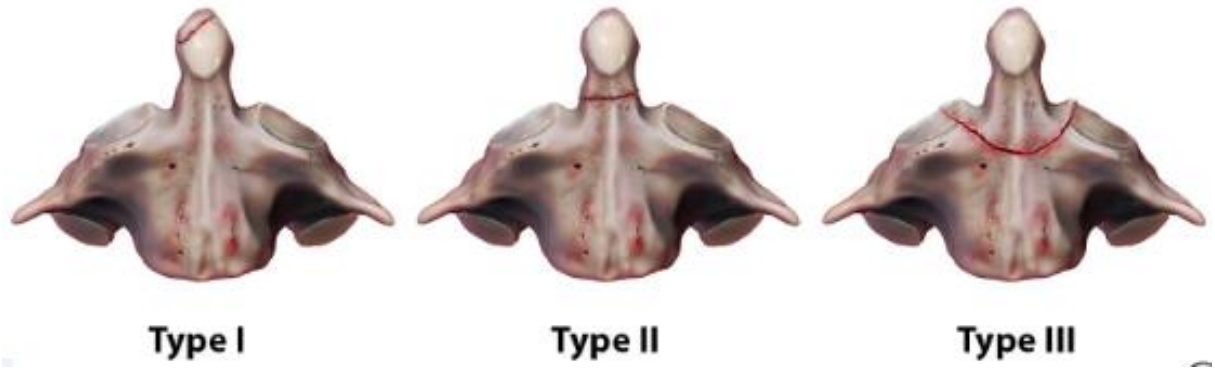

Figure 4 : Fracture types according to the Anderson and D'Alonzo classification.

ACKNOWLEDGEMENTS

The authors thank the radiology department for their expertise and assistance in imaging studies. We are grateful to the patient for her cooperation and consent to publish this case.

REFERENCES

[1] « Spinal cord injuries due to diving accidents - PubMed ». Consulté le: 27 février 2026. [En ligne]. Disponible sur: https://pubmed.ncbi.nlm.nih.gov/15558081/

[2] M. N. Hadley, C. A. Dickman, C. M. Browner, et V. K. Sonntag, « Acute axis fractures: a review of 229 cases », J Neurosurg, vol. 71, no 5 Pt 1, p. 642-647, nov. 1989, doi: 10.3171/jns.1989.71.5.0642.
https://doi.org/10.3171/jns.1989.71.5.0642

[3] C. Wilson et al., « Institutional review of the management of type II odontoid fractures: associations and outcomes with fibrous union », J Neurosurg Spine, vol. 34, no 4, p. 623-631, avr. 2021, doi: 10.3171/2020.8.SPINE20860.
https://doi.org/10.3171/2020.8.SPINE20860

[4] B. B. Butt, P. Gagnet, R. Patel, et I. Aleem, « Congenital defect of the posterior arch of C1: a case report », J Spine Surg, vol. 7, no 2, p. 214-217, juin 2021, doi: 10.21037/jss-20-628.
https://doi.org/10.21037/jss-20-628

[5] T. A. Windsor, S. Z. Tewelde, K. M. Blosser, et A. C. Richardson, « An odontoid fracture and vertebral artery injury in fast-track », Clin Case Rep, vol. 8, no 9, p. 1847-1849, sept. 2020, doi: 10.1002/ccr3.2952.
https://doi.org/10.1002/ccr3.2952

[6] G. Rao et R. I. Apfelbaum, « Odontoid screw fixation for fresh and remote fractures », Neurol India, vol. 53, no 4, p. 416-423, déc. 2005, doi: 10.4103/0028-3886.22607.
https://doi.org/10.4103/0028-3886.22607

[7] F. Sommer et al., « Treatment of Odontoid Fractures in Elderly Patients Using C1/C2 Instrumented Fusion Supplemented With Bilateral Atlantoaxial Joint Spacers: A Case Series », Int J Spine Surg, vol. 16, no 3, p. 442-449, juin 2022, doi: 10.14444/8250.
https://doi.org/10.14444/8250

[8] B. Fazzolari, G. Jannelli, E. Conti, A. Delitala, E. Tessitore, et A. Brunori, « Clinical and radiological outcome after minimally invasive surgical approach for type II unstable odontoid fractures », Neurochirurgie, vol. 67, no 4, p. 350-357, juill. 2021, doi: 10.1016/j.neuchi.2020.11.014.
https://doi.org/10.1016/j.neuchi.2020.11.014

[9] A. Deluca, F. Wichlas, C. Deininger, A. Traweger, et E. J. Mueller, « Reevaluation of a classification system: stable and unstable odontoid fractures in geriatric patients-a radiological outcome measurement », Eur J Trauma Emerg Surg, vol. 48, no 4, p. 2967-2976, août 2022, doi: 10.1007/s00068-022-01985-0.
https://doi.org/10.1007/s00068-022-01985-0