



Case Report

Double-level myelopathy due to atlantoaxial dislocation (os odontoideum) and subaxial cervical spondylosis with angular kyphosis

Abolfazl Rahimizadeh, Housain Soufiani, Shaghayegh Rahimizadeh

Pars Advanced and Minimally Invasive Medical Manners Research Center, Pars Hospital, Iran University of Medical Sciences, Tehran, Iran.

E-mail: *Abolfazl Rahimizadeh - a_rahimizadeh@hotmail.com; Housain Soufiani - soufianihosein@gmail.com; Shaghayegh Rahimizadeh - sherryrahimi@hotmail.com



***Corresponding author:**

Abolfazl Rahimizadeh,
Pars Advanced and Minimally
Invasive Medical Manners
Research Center, Pars Hospital,
Iran University of Medical
Sciences, Tehran, Iran.

a_rahimizadeh@hotmail.com

Received : 16 March 2020

Accepted : 15 April 2020

Published : 09 May 2020

DOI

10.25259/SNI_104_2020

Quick Response Code:



ABSTRACT

Background: The surgical management of cervical spondylotic myelopathy (CSM) attributed to os odontoideum (OO with atlantoaxial instability atlantoaxial instability) and subaxial kyphosis together pose significant surgical challenges.

Case Description: An elderly male presented with CSM/myelopathy and severe quadriparesis attributed to an unstable OO and 87° fixed, subaxial cervical kyphosis. After performing a 540° spinal cord decompression with atlantoaxial fixation, the patient did well.

Conclusion: Double-level CSM due to an unstable OO and subaxial kyphosis is rare and typically requires combined 540° decompression and stabilization.

Keywords: Anterior osteotomy, Cervical spine, Fixed cervical kyphosis, Pedicle screw fixation, Smith-Peterson osteotomy

INTRODUCTION

Unstable os odontoideum (OO) with atlantoaxial dislocation and subaxial “draping of the cervical spinal cord” over a kyphotic deformity contributed to dual-level significant cord compression and myelopathy in a 78-year-old male.^[1-11]

Following a 540° anterior-posterior-anterior decompression and fusion, the patient improved.

CASE REPORT

A 78-year-old wheel chair bound male developed a severe spastic quadriparesis with sphincter disturbance over a 2-year period. His modified Japanese Orthopedic Association (mJOA) score was 8. Cervical X-rays, MR, and CT studies demonstrated OO instability with subaxial C4-C6 cord compression; there was an accompanying 87° fixed kyphosis [Figures 1-3].

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2020 Published by Scientific Scholar on behalf of Surgical Neurology International

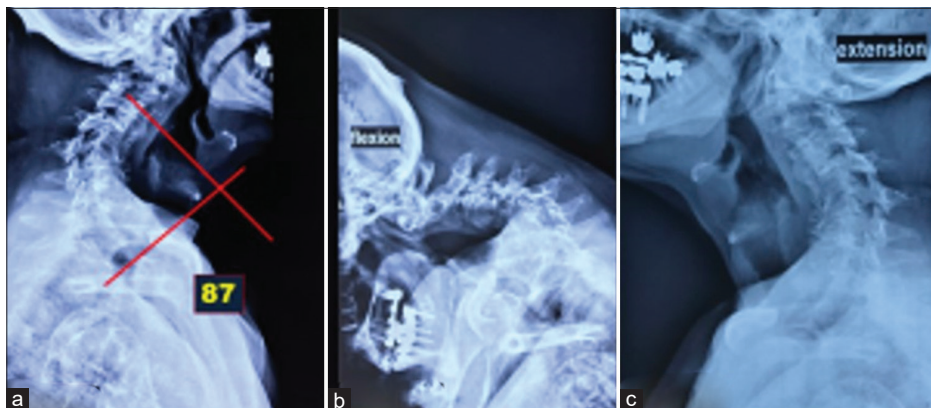


Figure 1: Lateral cervical radiographs, (a) lateral showing 87° subaxial kyphosis, (b) in flexion, kyphosis is aggravated with flexion, note atlantoaxial dislocation, (c) in extension, shows that the kyphosis is fixed.

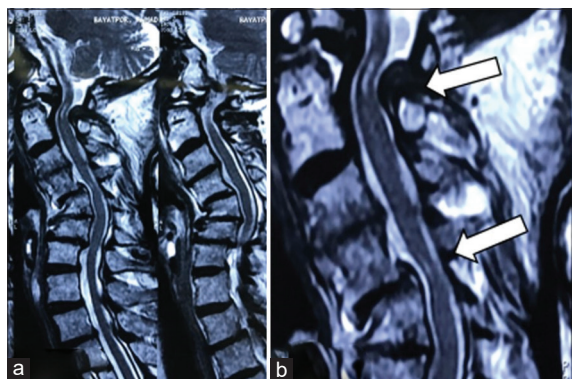


Figure 2: Magnetic resonance imaging (a) demonstrates cervical myelopathy and posteriorly displaced os odontoideum (b) note two myelopathy patches one at upper and one at mid-cervical region.

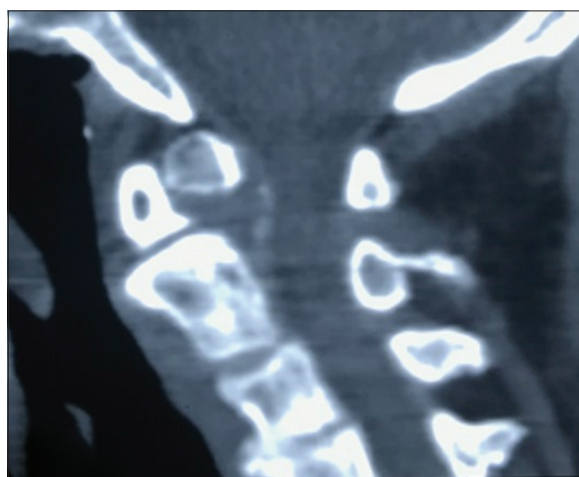


Figure 3: Computerized tomography scan sagittal reconstructed shows a posteriorly displaced os odontoideum.

Surgical intervention

The patient underwent a C2 to C7 laminectomy with C1 lateral mass screw placements and insertion of bilateral

pedicle screws from C2 to C7 bilaterally [Figure 4]. After assembling a rod on one side from C2 to C7, multilevel Smith-Peterson osteotomies (SPOs) were performed on the contralateral side and vice versa [Figures 5 and 6]. An expandable cage was placed within the corpectomy site; when it became loose intraoperatively, the patient had to undergo anterior cage repositioning. Notably, all procedures were performed utilizing intraoperative neuromonitoring that demonstrated no changes.

The intraoperative cervical cross-table X-ray ultimately confirmed adequate C1 to C7 instrumentation with a 100° correction of the kyphosis [Figure 7a]. Three months later, the patient was able to eat and button his shirt without difficulty and ambulated with a walker (mJOA score: 11) [Figure 7b]. At 1 postoperative year, he demonstrated no further recovery, and the cervical X-ray showed no further changes in sagittal alignment [Figure 8].

DISCUSSION

Management of OO with instability

The discovery of a symptomatic OO in an elderly patient is rare; we found only 12 such cases in the literature.^[8,9] The management of symptomatic OO with reducible atlantoaxial instability has evolved to now using either a C1-2 screw rod fixation or the Harms technique.^[4-8]

Treatment of subaxial CK

With an angular kyphosis from 30° to 90°, 540° surgery with a combination of anterior-posterior-anterior decompression/fusion may be warranted. In this case, while supine, the patient underwent a two-level corpectomy with three-level anterior osteotomy (C4-C6) (ATO).^[2] Secondly, while prone a C2 to C7 laminectomy with C1 lateral mass screw placements, and insertion of bilateral pedicle screws from C2 to C7 with multilevel SPOs were



Figure 4: Intraoperative fluoroscopy shows inserting pedicle screws before posterior osteotomy.

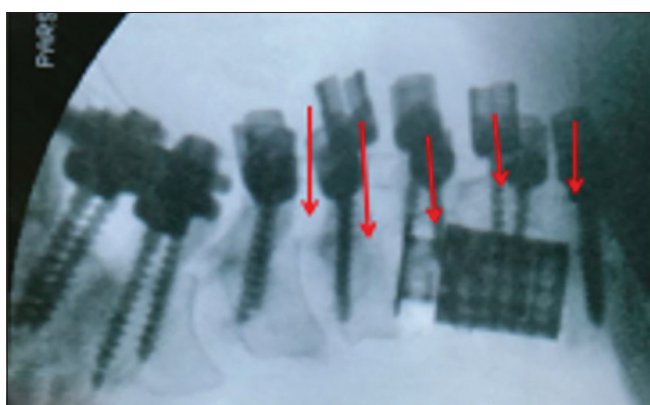


Figure 5: Smith-Peterson osteotomy from C2 to C7 along with pedicle screws, note at corpectomy site, short screws is used, note anterior osteotomy at corpectomy levels.

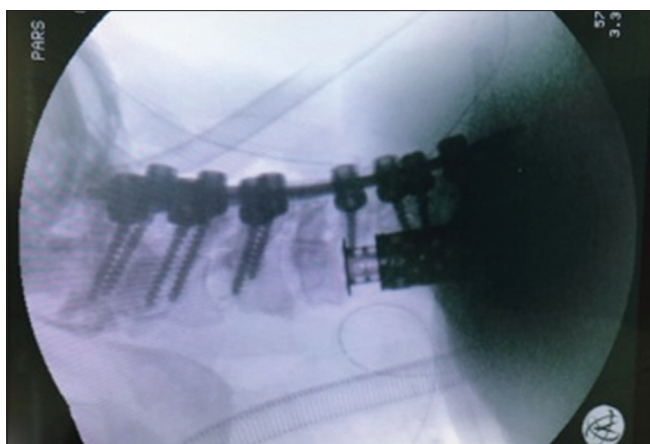


Figure 6: Intraoperative fluoroscopy after assembling the rods, note an acceptable lordosis could be obtained.

performed (C2-C7) [Figures 8 and 9].^[10,11] In addition, a third anterior procedure was required to revise the “loose: anterior construct.”



Figure 7: Cervical X-ray (a) lateral cross table. A week after surgery, lordosis is 13°, this means that 100° correction. (b) Lateral in sitting position.

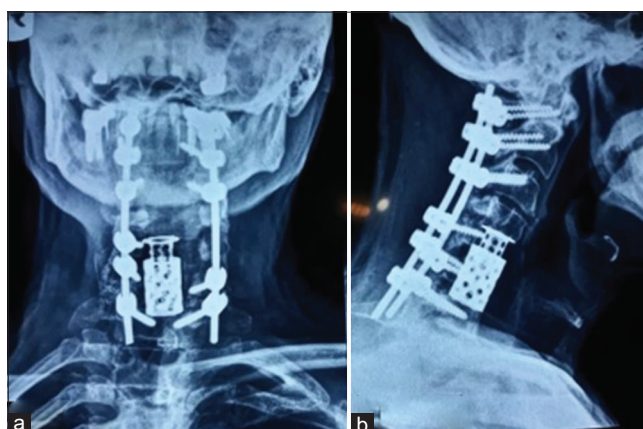


Figure 8: Plain cervical X-ray at 1-year FU (a) AP and (b) lateral X-ray at 1-year follow-up.

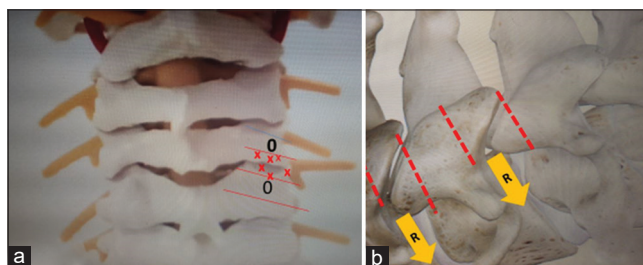


Figure 9: Schematic drawing, (a) front view the sites of foraminotomies and pedicle screw insertion, (b) lateral view shows the amount of lateral masses that should be drilled at each level with posterior osteotomy.

CONCLUSION

For patients displaying OO/instability and subaxial cervical kyphosis, combined anterior followed by posterior decompression/fusion surgery may be warranted.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Ganju A, Ondra SL, Shaffrey CI. Cervical kyphosis. *Tech Orthop* 2002;17:345-54.
2. Kim HJ, Piyaskulkaew C, Riew KD. Anterior cervical osteotomy for fixed cervical deformities. *Spine (Phila Pa 1976)* 2014;39:1751-7.
3. O'Shaughnessy BA, Liu JC, Hsieh PC, Koski TR, Ganju A, Ondra SL. Surgical treatment of fixed cervical kyphosis with myelopathy. *Spine (Phila Pa 1976)* 2008;33:771-8.
4. Rahimizadeh A, Malekmohammadi Z, Karimi M, Rahimizadeh A, Asgari N. Unstable os odontoideum contributing to cervical myelopathy and obstructive sleep apnea. *Surg Neurol Int* 2019;10:125.
5. Rahimizadeh A, Rahimizadeh A. Os odontoideum: A review article. *Orthop Res Traumatol* 2016;1:33-55.
6. Rahimizadeh A, Soufiani HF, Hassani V, Rahimizadeh A. Atlantoaxial subluxation due to an os odontoideum in an achondroplastic adult: Report of a case and review of the literature. *Case Rep Orthop* 2015;2015:142586.
7. Rahimizadeh A, Williamson WL, Rahimizadeh S, Amirzadeh M. Atlantoaxial subluxation secondary to unstable os odontoideum in a patient with arrested hydrocephalus due to congenital aqueductal stenosis: A case report. *Int J Spine Surg* 2018;12:549-56.
8. Rahimizadeh A, Williamson WL, Rahimizadeh S, Amirzadeh M. Surgical management of an elderly patient with free floating os odontoideum. *J Spine Neurosurg* 2019;8:1-4.
9. Rimizadeh A, Habibi G. Os odontoideum in an elderly: Report of a case and review. *World Spinal Column J* 2011;2:102-8.
10. Rimizadeh A. Oral Presentation: Marked Cervical Kyphotic Deformity: Report of 22 Cases with Special Reference to Multilevel Cervical Posterior Osteotomy. *Eur spine J* 2016;25(3): S334- S76.
11. Sin AH, Acharya R, Smith DR, Nanda A. Adopting 540-degree fusion to correct cervical kyphosis. *Surg Neurol* 2004;61:515-22.

How to cite this article: Rahimizadeh A, Soufiani H, Rahimizadeh S. Double-level myelopathy due to atlantoaxial dislocation (os odontoideum) and subaxial cervical spondylosis with angular kyphosis. *Surg Neurol Int* 2020;11:100.