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## Atlantoaxial dislocations

### A retrospective study of 35 cases

Arturo Paz-Esquerre, MD\*

*Of 35 patients with C1-C2 dislocations, 37% (13 cases) had a history of rheumatoid arthritis, 11% (4 cases) had trauma as well as rheumatoid arthritis, and 25.7% (9 cases) had severe motor deficit quadriplegia or quadriplegia. One patient, representing 2.8% of the total, had a brain contusion related to closed head trauma.*

ATLANTOAXIAL dislocation is of major significance because of the close relationship of this area with the upper spinal cord and medulla. The presence of an atlantoaxial dislocation, regardless of the cause, poses a threat to the normal function of the upper levels of the cord or medulla. Early detection of this important condition cannot be overemphasized.

Dislocation should be considered in any case with injury to the head or the cervical spine, and in any unexplained neurological deterioration, even with a history of remote trauma or in a patient with rheumatoid arthritis. When two conditions are superimposed, this dislocation can be easily overlooked, with devastating results to the patient.

#### Materials and methods

Thirty-five cases with C1-C2 dislocations were reviewed, covering a period from 1962 to 1976. Twenty-six patients were seen by the department of neurosurgery at Henry Ford Hospital; nine were seen in private practice.

Dr. Robert S. Knighton was the surgeon in charge for most of the cases at Henry Ford Hospital. Care of some of the patients was shared by the orthopedic department.

The age of these patients ranged from three years to 95. Most were in the sixth decade. There were 19 males and 15 females.

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## Atlantoaxial dislocations

The most common complaint was pain in the suboccipital area and the upper cervical regions. A few patients had experienced paresthesias in the extremities. Some had experienced vertigo. Six patients reported a main complaint of quadriparesis or quadraplegia. Duration of symptoms was from a few hours to five years.

A history of rheumatoid arthritis was elicited in 13 cases. Nineteen cases were of traumatic origin. Both rheumatoid arthritis and trauma were present in four cases. There were two reported diving accidents, one fight, five automobile accidents, one fall, four incidents of brain concussion. There was one instance of severe brain contusion with associated intracranial injury. Associated cervical lesions included one instance of compressed C5 vertebral body, one instance of cervical spondylitis, one instance of dislocation of C3-C4 because of rheumatoid arthritis.

Neurological findings showed that motor deficits were represented by one quadraplegia, one transient quadraplegia, a third quadraplegia that was relieved by skeletal traction, six with marked quadraparesis, and one case of isolated deltoid weakness. The deep tendon reflexes were hyperactive in 10 cases. Associated neurological deficits were present in six cases, including bilateral sixth nerve palsy, brachial plexus injury, and diplopia.

Radiologic films showed odontoid fractures in seven cases. Two cases had fractures of the body of C2, one with comminuted fracture and one upper part of C2. A congenital abnormality of the odontoid was present in two cases, with failure of fusion of the base with the upper segment.

The presence of rheumatoid odontoid with erosive changes was seen in seven cases. The transverse atlanto ligament was found incompetent in 25 cases. Of these, nine were felt to be of traumatic origin, 14 were related to rheumatoid arthritis, one was

related to Paget's disease, another one was related to a viral infection in the parotid. Pseudobasilar invagination was seen in three cases with rheumatoid arthritis. The displacement between the anterior arch of the atlas and odontoid varied from a few millimeters to 20 millimeters. The spinal canal varied in its sagittal diameter from no reduction to six millimeters.

Of the patients treated, 18 had posterior cervical fusion with iliac bone graft between the first two or three segments, along with internal fixation with wires. The patients that were operated for myelopathy showed cessation of progression or became better. The pain subsided in the suboccipital region.

One patient died from pulmonary embolism while in a Minerva jacket in the postoperative period. Most of the patients had Minerva jackets, halo, or four-poster brace following the operation. Five children under 11 years of age were treated conservatively with braces with good results.

There were 12 unoperated patients. Eight were rheumatoid arthritis cases, one case showing definite progressive myelopathy as the dislocation worsened in a few years' span. Three were trauma cases, one of whom died three days later in tongs as a result of the injury. One had a fractured odontoid and was treated conservatively.

## Discussion and summary

The morbidity and mortality of this condition can be a result of the initial injury or a result of a chronic delayed myelopathy. In general, adults should be treated with a posterior cervical fusion and children should be treated conservatively. Patients with rheumatoid arthritis should be followed for their neurological status, although most of these cases do not give rise to neurological deficits. Those who do deteriorate deserve surgery for restabilization of the upper cervical segments.

# References

1. Alexander E Jr, Foresyth, HF, Davis CH Jr and Nashold BS Jr: Dislocation of the atlas on the axis. The value of early fusion of C1, C2 and C3. *J Neurosurg* **15**:353-371, 1958
2. Alexander E Jr, Masland R and Harris C: Anterior dislocation of first cervical vertebra simulating cerebral birth injury in infancy. *Amer J Dis Child* **85**:173-181, 1953
3. Amyes EW and Anderson FM: Fracture of the odontoid process. *Arch Surg* **72**:377-393, 1956
4. Bachs S, Barraquer-Bordas L, Barraquer-Ferré L, Canadell JM and Modolell A: Delayed myelopathy following atlanto-axial dislocation by separated odontoid process. *Brain* **78**:537-553, 1955
5. Barton LG Sr: The reduction of fracture dislocations of the cervical vertebrae by skeletal traction. *Surg Gynec Obstet* **67**:94-96, 1938
6. Blockey NJ and Purser DW: Fractures of the odontoid process of the axis. *J Bone Jt Surg* **38-B**:794-817, 1956
7. Cone W and Turner WG: The treatment of fracture-dislocations of the cervical vertebrae by skeletal traction and fusion. *J Bone Jt Surg* **19**:584-602, 1937
8. Dasfur DK, Wadia NH, Desai AD and Sinh G: Medullary compression due to atlanto-axial dislocation and sudden hematomyelia during decompression. *Brain* **88**:897-923, 1965
9. Fang HSY and Ong GB: Direct anterior approach to the upper cervical spine. *J Bone Jt Surg* **44-A**:1588-1604, 1962
10. Greenberg AD: Atlanto-axial dislocations. *Brain* **91**:655-684, 1968
11. Hinck VC and Hopkins CE: Measurement of the atlanto-dental interval in the adult. *Am J Roentg* **84**:945-951, 1960
12. Kahn EA and Yglesias L: Progressive atlanto-axial dislocation. *JAMA* **105**:348-352, 1935
13. Kornblum D, Clayton ML and Nash HH: Nontraumatic cervical dislocations in rheumatoid spondylitis. *JAMA* **149**:431-435, 1952
14. Lippman RK: Arthropathy due to adjacent inflammation. *J Bone Jt Surg* **35-A**:967-979, 1953
15. List CF: Neurologic syndromes accompanying developmental anomalies of occipital bone, atlas and axis. *Arch Neur & Psych* **45**:577, 1941
16. Martel W and Page JW: Cervical vertebral erosion and subluxations in rheumatoid arthritis and ankylosing spondylitis. *Arth & Rheumat* **3**:546, 1960
17. Mixer, SJ and Osgood RB: Traumatic lesions of the atlas and axis. *Ann Surg* **51**:193-207, 1910
18. McRae DL: Bony abnormalities in the region of the foramen magnum: Correlation of the anatomic and neurologic findings. *Acta Radiol* **40**:335-354, 1953
19. McRae, DL: The significance of abnormalities of the cervical spine. *Am J Roentg* **84**:3-25, 1960
20. Osgood, RB and Lund CC: Fractures of the odontoid process. *N Eng J Med* **198**:61-71, 1928
21. Rogers, WA: Treatment of fracture-dislocation of the cervical spine. *J Bone Jt Surg* **24**:245-258, 1942
22. Schneider RC and Schemm GW: Vertebral artery insufficiency in acute and chronic spinal trauma. With special reference to the syndrome of acute central cervical spinal cord injury. *J Neurosurg* **18**:348-360, 1961
23. Sharp P and Purser DW: Spontaneous atlanto-axial dislocation in ankylosing spondylitis and rheumatoid arthritis. *Ann Rheum Dis* **20**:47-76, 1961
24. Turner WG and Cone WV: The treatment of fracture-dislocation of the cervical vertebrae by skeletal traction and fusion. *Proc Inter-St Post-Grad Med Ass N Amer*, 1-14, 1938
25. Watson-Jones R: Spontaneous hyperemic dislocation of the atlas. *Proc R Soc Med* **25**:586-590, 1932