

Occupational Therapy in Atlanto Axial Dislocation: A Case Study

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Abstract: ***Introduction:** The atlantoaxial joint loses stability due to trauma, inflammation, an idiopathic or congenital abnormality. Other symptoms include a restriction in neck movements, weakness, numbness, sphincter dysfunction, lower cranial nerve dysfunction, respiratory distress. Atlantoaxial Dislocation is considered life-threatening, due to the devastating neurological damage it causes. **Case Description:** A nine-year-old male had fallen from the stairs. After fall, he becomes unconscious with the stiffness of the body. Radiographic examination shows that they had atlantoaxial joint dislocation with spinal cord compression. On examination, there is increased tone, exaggerated deep tendon reflexes, positive Babinski sign, muscle wasting, reduced muscle strength. On postural examination head was laterally flexed to the left side, left shoulder was protracted & dropped, winging of the scapula was present. **Treatment:** Four weeks of occupational therapy programme was given with the focus on improving ranges of motion (ROM) at the cervical & shoulder, strength improvement, enhancing hand functions, improving balance & coordination, prevention of any further deformity **Conclusion:** Occupational Therapy has to be initiated as early as possible to improve symptoms and is proven to be very effective in atlantoaxial joint dislocation.*

Keywords: Atlantoaxial Joint, Occupational Therapy, Tone

1. Introduction

Atlanto-Axial joint dislocation refers to stability between the atlas and axis resulting in loss of normal articulation. It not only provides complex movements to the cervical spine but also provide sufficient mechanical strength to stabilize the head.¹

The atlantoaxial joint loses stability due to trauma, inflammation, an idiopathic or congenital abnormality. It occurs in all age group but mainly in adolescence. Traumatic Dislocation is due to forced displacement of the neck which results in disruption of transverse ligament. Along with disruption of transverse ligament, it sometimes involves simultaneous disruption of alar and apical ligament. The clinical features range from minor axial neck pain to death. Other symptoms include the restriction in neck movements, weakness, numbness, sphincter dysfunction, lower cranial nerve dysfunction, respiratory distress. Further complications include myelopathy, vertebral artery dissection, neurological involvement, and death.¹

Atlantoaxial subluxation occurs rarely in the adult population and it is only responsible for 2.5% of all the spinal afflictions². It is predominant in the paediatric population due to an enhanced elasticity of ligaments, horizontally oriented, shallower joint surfaces of the lateral masses, a not fully developed neck musculature and a bigger head-body relationship³. Also, conditions that enhance ligamentous laxities such as Down syndrome, Marfan Syndrome, and Marfan syndrome, correlate with a higher incidence of rotatory subluxation⁴.

Atlantoaxial Dislocation is considered life-threatening, due to the devastating neurological damage it causes. Recent advances in modern medical systems and patient care with trauma have increased the survival of patients with these injuries.

Diagnosis is usually done by defining by radiographic measurement of alto axial joint articulation using atlantodental interval (ADI). The ADI is a small slit-like space between the posterior aspect of the anterior atlas ring and the anterior aspect of the odontoid process. A radiograph is taken during flexion and extension of neck to determine atlantodental interval.¹

Atlantoaxial dislocations can cause severe neural damage with a long term sequelae and if not treated promptly may cause death also. Prognosis of such injuries correlates with time between the injury and reduction. If untreated after one to three months it becomes irreducible and requires a surgical approach^{5, 6}. Due to its lower incidence rate, this condition is frequently undiagnosed or the diagnosis is delayed and the outcome is worse³.

The management goals of the patient are to treat the instability of the atlantoaxial joint, followed by rehabilitation to restore and prevent possible effects of neurological compromise and to achieve the functional pain-free motion of this joint¹

There are reports of patients with the cervical injury without neurological deficit, in which delayed diagnosis and initial stabilization lead to a worse prognosis for the patient in the short to medium terms. The development of neurological disturbances is prevented by reduction and early fusion as definitive treatment.

Treatment aims at correction of sagittal alignment of the upper cervical spine. The main surgical procedure which is used is posterior occipitocervical fusion after transoral odontoidectomy or periodontoid tissue release. Non-Surgical treatment includes cervical traction in the supine position, active range of motion exercises of neck.¹

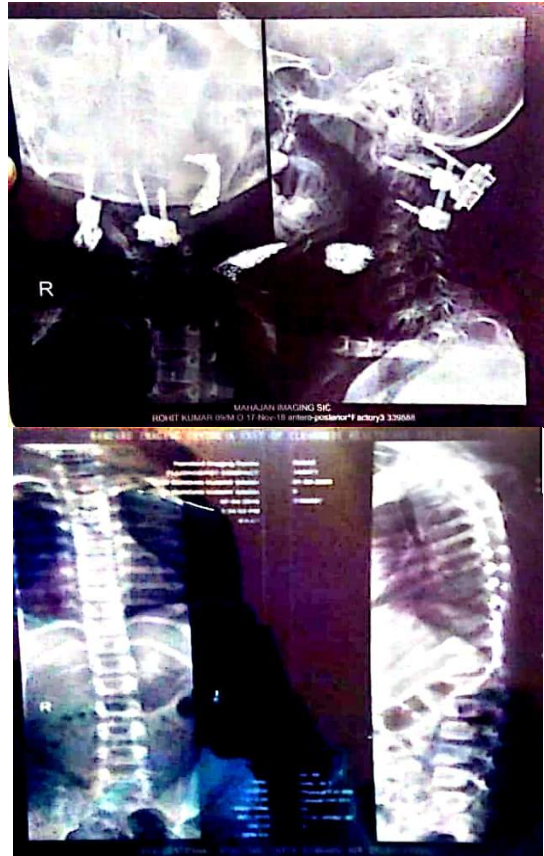
2. Case Description

A 9 yr. the old male was apparently well until he had a fall from stairs while playing. His parent took him to the hospital. According to the hospital medical reports, patient's posterior of the neck hit the edge of the stairs, the patient had been unconscious for a short time & then his body become stiff & immobile for 2 to 5 minutes. Afterwards, he started complaining of severe headache. The patient was taken to the radiological department, and computed tomography for the head, conventional radiography, computed tomography with multiplanar reconstruction and MRI of the cervical spine were performed. Radiography examination demonstrated atlantoaxial dislocation with the spinal cord compression. Then he underwent the open surgical reduction. Screws & fixtures were used to stabilize the joint. After the surgery left half of the body (both upper & lower extremity) become weak.

They went to another hospital for the second opinion & there they were referred to the rehabilitation department for the evaluation & examination. In the rehabilitation department, he underwent a detailed occupational therapy assessment. MRI report shows atlantoaxial dislocation with hypoplastic odontoid with occipitalisation of the atlas with posteriorly angulated odontoid process causing marked compression of the cervicomedullary junction with resultant oedema at C2-C3 level. CT scan shows C1-C2 lateral mass rod & screw fixation & removal of the posterior arch of C1 is noted.

On examination muscle tone was increased on the left half of the body, deep tendon reflexes were exaggerated, Babinski sign was positive, clonus was present at ankle. Limited active movement at the cervical & left shoulder was examined. Muscle wasting was present with reduced muscle strength. Handgrip & hand function was also impaired.

On postural examination head was laterally flexed to the left side, left shoulder was protracted & dropped, winging of the scapula was present. Hip was dropped from the left side, left knee was hyperextended. Sensory examination demonstrated superficial senses (temperature, pressure) were impaired on the left side of the body. Difficulty in balancing & coordination was also observed.



3. Treatment

The occupational therapy programme was focussed on improving ranges of motion (ROM) at the cervical & shoulder, strength improvement, enhancing hand functions, improving balance & coordination, prevention of any further deformity. Occupational therapy protocol consisted of gentle active & passive range of motion (ROM) exercises, weight bearing (affected side) along with midline crossing (unaffected side) activity, therapeutically activities & resistive exercises (upper & lower extremity). The patient was also advised to use the cervical collar for better stability & medial arch support in shoes for flat feet on both sides to prevent knock knees.

Patient's mother was given a detailed home programme & also trained to perform a set of exercises with him at home daily. Four weeks later, continuous active ranges of motion at shoulder & cervical was improved, strengthening exercises were progressed gradually to achieve better strength. Hand grip was significantly improved; he was able to take a glass of water to his mouth with his left hand, which earlier was not possible for him. There was a significant improvement in his posture as well, his gait was more stable & needed no support while walking.



4. Conclusion

Atlantoaxial dislocation is a rare, but severe if untreated, condition in the adult population. The best way to ensure the diagnosis properly is by using advanced radiography findings. The delay between injury and management affects prognosis. Initial treatment involves a non-surgical approach and a better outcome. After open reduction, it is necessary to start a rehabilitation programme as soon as possible to avoid the functional limitation & prevent any further deformity which may arise due to restricted ranges & neurological involvements. Occupational Therapy has to be initiated as early as possible to improve symptoms and is proven to be very effective in atlantoaxial joint dislocation.

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