

## Case Report

# The Surgical Management of Traumatic C6-C7 Spondyloptosis

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A case of traumatic spondyloptosis of the cervical spine at the C6-C7 level is reported. The patient was treated successfully with a anterior-posterior combined approach and decompression. The patient had good neurological outcome after surgery. A 51-year-old female patient was transported to our hospital's emergency department after a vehicle accident. The patient was quadriparetic (Asia D, MRC power 4/5) with severe neck pain. Plain radiographs, computerized tomography and spinal magnetic resonance imaging (MRI) showed C6-7 spondyloptosis and C5, C6 posterior element fractures. Gardner-Wells skeleton traction was applied. Spinal alignment was rechecked by traction and dislocation was decreased to a grade 1 spondylolisthesis. Then the patient was firstly operated by anterior approach. Anterior stabilization and fusion was firstly achieved. Seven days after first operation the patient was operated by a posterior approach. The posterior stabilization and fusion was achieved. Postoperative lateral X-rays and three-dimensional computed tomography showed the physiological realignment and the correct screw placements. The patient's quadriparetic was improved significantly. Subaxial cervical spondyloptosis is a relatively rare clinical entity. In this report we present a summary of the clinical presentation, the surgical technique and outcome of this rarely seen spinal disorder.

**Key Words :** Cervical spondyloptosis · Spinal cord compression · Spinal stabilization.

## INTRODUCTION

Spondyloptosis is a form of the spine dislocation or advanced spondylolisthesis, in which spondyloptotic corpus is fully dislocated in anterior or posterior space of the other one<sup>2)</sup>. Spondyloptosis can be seen after trauma, or in the course of neoplastic or congenital diseases<sup>2)</sup>. Lumbar spine is the most common affected area for spondyloptosis<sup>4)</sup>. Subaxial cervical spine can be affected rarely. Only a few cases have been reported in the literature<sup>2-4)</sup>. In this report we present a case of traumatic C6-7 spondyloptosis and discuss the current surgical treatment modalities, in the light of the relevant literature.

## CASE REPORT

A 51-year-old female patient was transported to our hospital's emergency department after a vehicle accident. The patient had diabetes mellitus for 10 years and she developed a hypoglycemic coma in the day of accident. The patient was quadriparetic

(MRC power 4/5, Asia D) with severe neck pain. Plain radiographs, computerized tomography and spinal magnetic resonance imaging showed C6-7 spondyloptosis and C5, C6 posterior element fractures (Fig. 1). Gardner-Wells skeleton traction was applied with 7 kg, after radiological evaluation. The traction weight was increased gradually and achieved to total 20 kg. Spinal alignment was rechecked by traction and dislocation was decreased to a grade 1 spondylolisthesis. Then the patient was initially operated by anterior approach. Anterior decompression was achieved by C6-7 discectomy. The anterior longitudinal ligament was torn and a cerebrospinal fluid (CSF) leakage was detected from a dural defect. Dural defect repaired partially by a synthetic dural substitute and fibrin sealant. Anterior stabilization was performed by C5-7 screw-plate system. The fusion was achieved by a cadaver fibula graft. A lumbar drainage system was placed after operation and CSF was drained continuously for 5 days. Seven days after first operation the patient was operated by a posterior approach. C5 partial, C6 total laminectomy and foraminotomy was performed. The posterior sta-

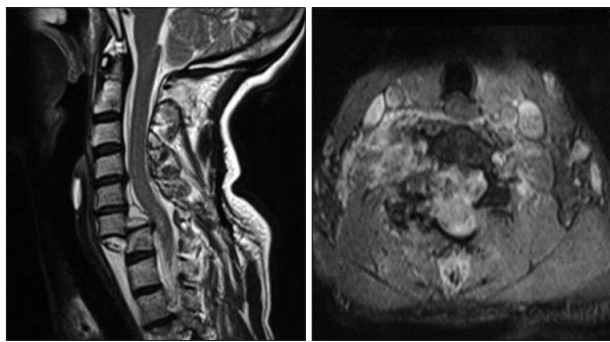
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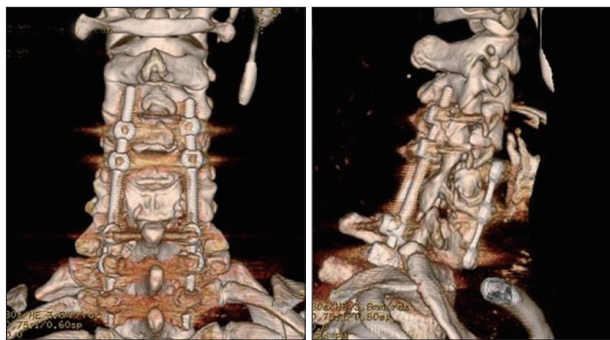
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**Fig. 1.** Magnetic resonance imaging of the cervical spine reveals total spondyloptosis at the C6-C7 level. Note the large disc which causes compression and edema in the lower spinal cord.



**Fig. 2.** Post-operative plain radiograph of the cervical spine with physiological realignment and anterior and posterior stabilization.



**Fig. 3.** Post-operative three-dimensional reconstruction computed tomography scan of the cervical spine.

bilization was performed C4 to T2 by C4-5 lateral mass and T1-T2 transpedicular screw fixation and constructs. Also, posterior fusion was done by autogeneous bone graft. Postoperative lateral X-rays and three-dimensional computed tomography showed the physiological realignment and the correct screw placements (Fig. 2, 3). The postoperative period was uneventful without any additional complication. The post-operative hospitalization time was 7 days. The patient was discharged from the hospital with a rigid cervical orthosis. The patient's quadriparesis was improved significantly. Lower-extremity paresis was completely resolved only distal part of the upper-extremity : finger flexion, finger extension and opposition were slightly parietic. The patient was neurologically intact at the second month of the follow-up after a rehabilitation (Asia E).

## DISCUSSION

The term spondyloptosis is made of spondylo and ptosis words and is used when the vertebrae slips and falls down totally in front of lower corpus from its original anatomical level<sup>4</sup>. Spondyloptosis can be frequently in the lumbar region but subaxial cervical spondyloptosis is extremely rare<sup>3,4</sup>. All of the ligamentous and osseous construction can be disrupted and the physiological alignment is discontinued due to an absolute displacement.

The etiology of the spondyloptosis in our patient was trauma. Trauma generally results in crushing the spinal cord, which could lead to severe neurological deficits such as quadriplegia. Posterior element fractures led to a spontaneous dorsal decompression of the spinal canal and this allowed the cord to move posteriorly<sup>2</sup>. This movement may preserve the spinal cord from subsequent injury as in our case. Cervical spondyloptosis can be treated conservatively or with either anterior, posterior or combined surgical approaches<sup>1,2,4</sup>. We decided to perform an anterior decompression as an initial approach to prevent spinal cord from subsequent compression from traumatic disc material. We expected a solid fusion with a combined anterior and posterior approach which restores spondyloptosis. Menku et al.<sup>3</sup> was also suggested that three-dimensional fixation for the cervical spine using the successful placement of lateral mass and transpedicular screw fixation and rod constructs with an anterior cervical plate offer significantly increased stability over that of other conventional cervical fixation systems. But Ozdogan et al.<sup>4</sup> indicated the possible risk of graft dislodgment that might be occurred if the initial operation was done anteriorly. They advocated the posterior approach as an initial operation. Our case was completely unstable due to complete disruption of all ligament structures involving three columns. Therefore, realignment and stabilization of cervical spine were achieved with combined anterior and posterior approach. The patient was symptom free and neurologically intact in her second month follow-up visit.

Cervical traction can be implemented to restore anatomic alignment in preparation for stabilization. But, the role of cervical traction in cases with partial neurological deficit is still controversial. Menku et al.<sup>3</sup> suggested that retropulsion of the disc into the spinal canal during traction could lead to compression of the spinal cord and cause neurological deterioration. However, Tumialan et al.<sup>5</sup> reported that fractures of the posterior elements functionally decompress the spinal canal and thereby allow for cervical traction to be safely implemented in spondyloptosis patients. In the presented case, we decided to reduce the spondyloptosis with cervical traction pre-operatively and achieve grade 1 spondylolisthesis then would make the anterior decompression and fusion safely without any additional neurological compromise.

## CONCLUSION

Subaxial cervical spondyloptosis is a relatively rare clinical en-

tity. Different clinical presentations in a wide range of neurologically intact to quadriplegia can be seen with spondyloptosis. The general medical and neurological status, also the wishes of the patient and the experience of the surgeon should be carefully taken into considerations in making a appropriate treatment plan.

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