Spondyloptosis of C₆-C₇: a rare case report

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【Abstract】A 35 years old female presented to us after falling from a height. She complained of a neck pain and a complete quadriplegia and was diagnosed as having spondyloptosis of the C₆-C₇. Skeletal traction was performed on her. CT scan showed fractures of the C₅, C₆, and C₇ vertebral body. The patient underwent anterior approach partial corpectomy with anterior cervical locking plate and strut grafting from ipsilateral iliac crest. Intraoperatively it was found that the disc was completely ruptured and there was a dural tear and cerebrospinal fluid leak. Her postoperative period was complicated by cerebrospinal fluid collection and posterior instrumentation was not performed due to the poor general condition. She had no neural recovery at the last follow-up. Spondyloptosis is a severe and highly unstable injury with a three column ligamentous disruption and may be complicated, as in our case, with a dural tear. Management of these cases is fraught with complications, and prognosis for neural recovery is dismal.

**Key words:** Spondylolisthesis; Spine; Spinal injuries

Spondyloptosis is a rare subtype of spondylolisthesis involving complete intercorporal displacement.¹ Most spondyloptosis occurs in the lumbar spine. Only a few case reports document spondyloptosis in the cervical spine.²⁻⁵ Causes of spondyloptosis reported include congenital vertebral anomalies and an ongoing pathological process in cervical spine.²⁻⁴ Here we report a case of traumatic spondyloptosis of the C₆-C₇ along with a review of the literature.

**CASE REPORT**

A 35-year-old female laborer presented in the emergency department with neck pain and weakness in all the four limbs after she fell from a 10-feet height when carrying weight on her head. Physical examination revealed tenderness at C₆-C₇ region of the cervical spine with complete motor and sensory loss below C₆. All superficial and deep tendon reflexes including bulbocavernous reflex were found absent. There were no associated injuries to the chest, abdomen and pelvis. Her neck was immobilized in a hard cervical collar and plain radiographs of the neck were obtained but did not show beyond the C₅-C₆ disc and upper half of the C₆ body. Subsequent magnetic resonance imaging of the cervical spine showed spondyloptosis at C₆-C₇ level with the C₆ vertebral body lying ventral to the C₇ vertebrae with marked cord compression (Figure 1). There was evidence to suggest cord contusion though the cord was in continuity. The disc at C₆-C₇ level was disrupted but not causing any gross neural compression. She was put on Crutchfield tongs skeletal traction, initially with 10 pounds and gradually with an increasing traction up to 20 pounds. Foley indwelling catheter was placed to measure the urinary output. Serial radiographs were taken to assess reduction. Partial reduction was achieved over 24 hours.

Bulbocavernous reflex returned after 24 hours. A fresh examination showed complete motor & sensory loss in all four limbs. Computed tomography (CT) of the cervical spine was done at this stage to assess the spinal alignment and associated fractures of body & posterior elements to plan for further intervention. It showed subluxation of the C₆ vertebra over C₇ with complete loss of
intervertebral disc space. It also revealed undisplaced fracture of the C₅ vertebral body with fractured lamina bilaterally, posterosuperior fracture of the C₆ with multiple fragments impinging into the thecal sac with lamina fractures, and fracture of the C₇ vertebral body with costo vertebral joint dislocation on the left side (Figure 2). Bilateral cervical ribs were also visualized. The patient was planned to take reduction under fluoroscopic control if she achieved anterior cervical stabilization using an anterior cervical locking plate in stage one followed by post instrumentation and fusion in stage two.

The patient was operated on in supine position. Reduction was achieved under fluoroscopic guidance.

Left side anterior approach partial corpectomy with anterior cervical locking plate and strut grafting from ipsilateral iliac crest were done (Figure 3). Intraoperatively, it was found that the disc was completely ruptured and there was a dural tear and cerebrospinal fluid (CSF) leak.

Postoperatively she was nursed in supine position. Local cerebrospinal fluid collection was noted in the perioperative period which subsided in 3 weeks without any intervention. Considering the poor general condition and high surgical risk, we did not perform posterior cervical instrumentation. The patient was discharged 2 months after surgery. No neural recovery was observed at the time of discharge. After one month it was reported that the patient died at home due to probable aspiration.

**DISCUSSION**

Spondylolisthesis and spondylolisthesis of the lumbar spine are well-described entities but they very rarely affect the cervical spine.² The reported causes of spondylolisthesis include an ongoing pathological process as aneurysmal bone cyst, Klippel-Feil syndrome, neurofibromatosis and absent posterior elements.² The anteroposterior displacement of the vertebrae in these cases is minimal as compared with that seen with spondylolisthesis.²

Isolated traumatic spondylolisthesis in the cervical spine has been reported sporadically.² The first reported case of spondylolisthesis was an eight years old girl subsequent to a significant birth trauma. She had spondylolisthesis of the C₆-C₇ with a late onset of cord compression and was managed by anterior decompression and in situ fusion with excellent neurological recovery.² A case of seven years old boy with spondylolisthesis at C₆-T₁ treated by posterior fusion was recounted in reference to the first case.³ Two cases of isolated posttraumatic spondylolisthesis have been reported in adults.⁵,⁶ Spondylolisthesis at C₆-T₁ level was treated by anterior decompression and in situ fusion without instrumentation and achieved a good neurologic outcome.⁶ A second case of C₆-7 spondylolisthesis with neurological intactness at the time of injury was treated by a single stage anterior-posterior and anterior operation.⁶ The present case is a rare report of isolated posttraumatic spondylolisthesis.

**Figure 1.** MRI showing spondylolisthesis at C₆-C₇ level with the C₆ vertebral body lying ventral to the C₇ vertebra with marked cord compression. **Figure 2.** After skeletal traction, CT scan showing fractures of the C₅, C₆ and C₇ vertebral bodies with multiple fragments of the C₆. The C₆ impinged into the thecal sac and had lamina fractures. **Figure 3.** Intraoperative fluoroscopy picture showing fixation with anterior cervical locking plate.
Spondyloptosis represents a compressive extension five-stage injury. It involves bilateral vertebral arch fracture with anterior displacement of the full vertebral body. Ligamentous failure occurs at two levels, posteriorly between the suprajacent and fractured vertebra and anteriorly between the fractured vertebra and subjacent one.

Attempt of reduction was considered hazardous in a previous report because of the long-standing nature of cord compression. Our case was a fresh traumatic spondyloptosis. We tried reduction preoperatively and partial alignment and reduction were achieved. This converted the severe translocation of the vertebral bodies to subluxation, thus making the operative procedure easier.

The decision-making process in regard to anterior versus posterior management of a cervical dislocation is multifactorial. The ultimate goal of either procedure is to obtain anatomic alignment, neural decompression, and to prevent further instability with a solid fusion. For patients with a large compressive disc herniation or significant burst fracture component, an anterior procedure is clearly the best choice, and in presence of multisegmental fractures or if biomechanical concerns over fracture stability prevail, a posterior procedure remains preferable. Combination treatment is contemplated for comprehensive fracture dislocations in patients with spinal cord injuries. Reported treatments of spondyloptosis have included anterior approach with or without instrumentation and posterior and anterior fusion. Preoperatively we used traction to achieve partial reduction of spondyloptosis. Use of traction should be judicious and monitored by fluoroscopy or serial radiographs since spondyloptosis is a three column ligamentous injury and overdistraction can easily result in further neural damage. We planned closed reduction under fluoroscopic guidance and if reduction was achieved, anterior fixation and fusion would be performed in stage I. In the next stage, posterior instrumentation and fusion to achieve stabilization was contemplated. Reduction was achieved and secured with plate fixation. The dural tear with CSF leak and the poor general condition of the patient were the major considered factors that made us unable to proceed to posterior fixation. Postoperatively CSF collection was encountered as a complication but it did not cause dysphagia or dyspnea and subsided itself in 3 weeks.

We have presented a case of acute traumatic spondyloptosis in an adult patient. Reduction and fixation are advocated to aid early rehabilitation. However, spondyloptosis is a kind of severe and highly unstable injury with a three column ligamentous disruption and may be complicated, as in our case, with a dural tear. Management of these cases is fraught with complications and the prognosis for neural recovery is dismal. We believe that if we have seen the whole condition early enough, judicious use of skeletal traction under radiological control may be helpful in achieving reduction and making the subsequent surgery for fusion stabilization easier.

REFERENCES


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