

# Traumatic High-Grade Cervical Dislocation: Treatment Strategies and Outcomes

Eric A. Sribnick<sup>1,\*</sup>, Daniel J. Hoh<sup>2</sup>, Sanjay S. Dhall<sup>1</sup>

## Key words

- Cervical spondylolisthesis
- Cervical spondyloptosis
- Cervical traction
- Spinal cord injury
- Spinal instrumentation

## Abbreviations and Acronyms

**ASI:** American Spinal Injury

**CT:** Computed tomography

**MRI:** Magnetic resonance imaging

**SCI:** Spinal cord injury



From the <sup>1</sup>Department of Neurosurgery, Emory University, Atlanta, Georgia; and <sup>2</sup>Department of Neurosurgery, University of Florida, Gainesville, Florida, USA

To whom correspondence should be addressed:

Sanjay S. Dhall, M.D.

[E-mail: [sanjaydhall@gmail.com](mailto:sanjaydhall@gmail.com)]

\*Present address: Department of Neurosurgery, University of California-San Francisco

Citation: *World Neurosurg.* (2014) 82, 6:1374-1379.

<http://dx.doi.org/10.1016/j.wneu.2014.02.008>

Journal homepage: [www.WORLDNEUROSURGERY.org](http://www.WORLDNEUROSURGERY.org)

Available online: [www.sciencedirect.com](http://www.sciencedirect.com)

1878-8750/\$ - see front matter © 2014 Elsevier Inc.

All rights reserved.

## INTRODUCTION

The current incidence of spinal cord injury (SCI) in the United States is reported to be 12,000 per year. These injuries often occur in younger individuals (mean age at injury, 34.2 years), and lifetime costs to patients can potentially exceed \$4 million (6). Although cervical spinal dislocations are often noted in series of traumatic SCI (1), there is less information regarding high-grade spondylolisthesis, and cervical spondyloptosis (>100% subluxation) is rarely reported in the literature (7, 8).

This study retrospectively examined 15 patients with high-grade traumatic cervical spondylolisthesis and includes 5 patients with traumatic spondyloptosis. We include the presentations, management techniques, and associated complications with these cases. In addition, three cases are highlighted and presented in detail.

## METHODS

This study was a retrospective analysis of 15 patients with high-grade cervical

■ **OBJECTIVE:** Traumatic high-grade cervical spinal dislocations are rare injuries, generally associated with severe neurological compromise. In particular, cervical spondyloptosis (>100% subluxation) is rarely reported. The object of our study is to present a case series describing presentation, management, and outcome in traumatic high-grade cervical spinal dislocations.

■ **METHODS:** Retrospective analysis was performed involving two level 1 trauma centers. Patients with a high-grade traumatic cervical subluxation were selected from a database, and these patients were admitted between August 2007 and July 2011.

■ **RESULTS:** Fifteen patients were identified; three had spondyloptosis. The admission American Spinal Injury Association Impairment Scale (AIS) grade varied (A = 9; B = 2; C = 1; D = 2; E = 1). Fourteen patients underwent attempted closed reduction with six (43%) failing closed reduction. High-dose methylprednisolone was administered in nine patients (60%). All patients underwent surgical stabilization: three underwent anterior only, three underwent posterior only, and nine underwent a combined anterior-posterior approach. Postoperatively, one patient improved two AIS grades, three improved one AIS grade, nine maintained their preoperative score, and two patients worsened.

■ **CONCLUSIONS:** In this series, 26.7% of patients had improvement in their AIS grade postoperatively, and the majority of patients (60%) maintained their preoperative AIS grade. In 57% of patients placed in traction, reduction was possible. Likely due to the severity of these injuries, there was a high incidence of complications. However, review of patient outcomes reveals that these patients can have improvement of neurological function. We recommend aggressive reduction and surgical stabilization. Our preference is either a combined anterior-posterior approach or a posterior-only approach.

spondylolisthesis and was approved by the Internal Review Boards at two level 1 trauma centers (Grady Memorial Hospital, Atlanta, GA; Shands at the University of Florida, Gainesville, FL). This cohort includes patients admitted from August 2007 to July 2011. Patients were selected from a SCI database and included patients with high-grade spondylolisthesis (>50%) due to trauma. The study size was based on the number of patients in the database who met the criteria for the study; no patients were excluded. Charts were assessed for clinical presentation, treatment modalities, admission and post-treatment neurological status, and complications. Clinical information was gathered from electronic records, radiology databases, operative

notes, and office charts. Neurological status is reported as the American Spinal Injury (AIS) association impairment scale grade and was determined preoperatively, postoperatively, and at follow-up. Neurological improvement or decline was based on comparing the postoperative and follow-up AIS grade with the preoperative AIS grade.

## RESULTS

Retrospective review of the SCI databases at the two included centers revealed 15 patients in total, and no patient was excluded. The data from all included patients were analyzed for preoperative and postoperative neurological function. Of

the 15 patients included, 4 patients were lost to follow-up and 1 died.

The median age of patients was 37 years (range, 18–76 years), and the reported series included 6 women and 9 men (Table 1). The level of dislocation was at C4-5 in one patient, C5-6 in three patients, C6-7 in eight patients, and at the C7-T1 junction in three patients. Of the 15 patients, 7 presented with grade 3 spondylolisthesis (50%–75% listhesis), 5 presented with grade 4 spondylolisthesis (76%–100% listhesis), and 3 patients presented with spondyloptosis (>100% listhesis). Preoperative radiographic findings for these patients are summarized in Table 2. For the computed tomography (CT) findings, comments on the facets are in regards to the facet joints at the level of the spondylolisthesis, and comments on the posterior elements are in regards to the posterior elements of the superiorly involved level of the spondylolisthesis. Radiographic evidence of anatomic spinal cord transection was noted in one patient. Magnetic resonance imaging (MRI) was performed in 11 patients and demonstrated disk herniation in 1 patient (Table 2).

Closed reduction was not attempted in the one patient who had MRI evidence of disk herniation (Table 3). A total of 14

patients were placed in traction, and successful reduction was achieved in 8 patients. The time from recognition of the traumatic spondylolisthesis to closed reduction was noted in 5 patients, and the mean time to reduction was 13.7 hours. High-dose methylprednisolone treatment was initiated in nine patients. Internal fixation was performed in all 16 patients, with anterior instrumentation alone in 3 patients, posterior instrumentation alone in 3 patients, and anterior/posterior instrumentation in 9 patients. More than 9 months of postoperative radiographic follow-up (static radiography, dynamic radiography, or CT) was available for five patients and indicated successful fusion in these patients.

The admission AIS grade was A in nine patients, B in two patients, C in one patient, D in two patients, and E in one patient. Postoperatively, one patient improved by two AIS grades, three patients improved on examination by one AIS grade, eight remained stable, two patients worsened, and one patient died (Table 4). Of the nine patients who have been followed, the mean length of follow-up is 22.3 months (range, 11–60 months). Three patients have improved on long-term follow-up (two patients by two AIS grades and one patient by one AIS grade).

The other six patients have remained at their postoperative AIS grade.

### Complications

Postoperative complications included one patient who died postoperatively from bowel infarction. There was no clear explanation for the bowel infarction, and the family did not consent to an autopsy. One patient worsened on examination before surgery and will be further described in the illustrative cases. One patient was originally treated with an anterior cervical discectomy and plate fixation; however, the cervical plate dislodged on postoperative day 2, therefore the patient was revised with a single level corpectomy and revision anterior instrumentation with supplemental posterior fixation. Surgery in one patient was complicated by intraoperative bleeding from an unrecognized vertebral artery dissection and had 1100 mL estimated blood loss during surgery. In a third patient, anterior open reduction was attempted but failed and posterior reduction and instrumentation were required.

### Illustrative Cases

**Case 1. Examination.** The patient is a 37-year-old man who was being pursued by law enforcement when he ran into high

Table 1. Preoperative Patient Data

Patient	Age (years)	Gender	Preoperative AIS Grade	Dislocation Level	Mechanism	Dislocation Grade
1	20	F	A	C6-7	Motor vehicular collision	5
2	37	M	C	C7-T1	Automobile versus pedestrian	5
3	19	M	A	C7-T1	Thrown from a horse	4
4	19	M	A	C6-7	Tree fell on automobile	4
5	47	F	A	C5-6	Motor vehicular collision	4
6	76	F	E	C5-6	Motor vehicular collision	4
7	28	F	B	C6-7	Fall	5
8	39	M	A	C6-7	Wrestling	3
9	46	M	D	C7-T1	Thrown from a horse	3
10	71	F	D	C6-7	Fall	3
11	36	M	A	C6-7	Bike accident	3
12	57	M	B	C6-7	Motor vehicular collision	3
13	40	M	A	C6-7	Motor vehicular collision	3
14	26	F	A	C5-6	Motor vehicular collision	3
15	18	M	A	C4-5	Diving accident	4

Download English Version:

<https://daneshyari.com/en/article/6045710>

Download Persian Version:

<https://daneshyari.com/article/6045710>

[Daneshyari.com](https://daneshyari.com)