The prevalence and the characteristics of C7 spondylolisthesis

Fumiaki Kanematsu, Teruo Kita
Kazushi Takayama, Toshiya Yasunami

Department of Orthopaedic Surgery
Osaka Saiseikai Nakatsu Hospital, Osaka, Japan
Introduction

Age-related degeneration and spondylolisthesis of the cervical spine have been reported.

It is difficult to diagnose C7 spondylolisthesis on plain lateral radiographs because the cervicothoracic junction is not always visualized.

Reports of C7 spondylolisthesis are extremely rare and the prevalence of cervicothoracic junction disease remains unclear.
Previous Reports

Case report of C7 and L4 degenerative spondylolisthesis in same patient.

The overall prevalence of degenerative spondylolisthesis in the cervical spine was 5.2%, with the most common level of involvement being C4-5.
Total : 9/174(5.2%) , C7-T1 : 1/174(0.57%).

Degenerative spondylolisthesis of the cervical spine.
C3-4 : 5cases, C4-5 : 5cases, C5-6 : 5cases, C7-T1 : 3cases.

Cervico-thoracic junction is an area of potential instability because of the rigid thoracic spine and mobile cervical segments.

Degenerative spondylolisthesis is relatively common in the cervical spine.

Motor deficits, especially in the C8 innervated muscles, can lead to serious long-term disability. Therefore, in patients with C8 weakness, especially in the dominant hand, surgery should be considered strongly.
Purpose

The first purpose of this study was to investigate the prevalence of C7 spondylolisthesis using cervical spine magnetic resonance imaging (MRI).

The second purpose was to examine the MRI findings and neurological symptoms of C7 spondylolisthesis.

Cervicothoracic junction is visualized.
Patients and Methods - 1 -

Between 2009 and 2010, a total of 530 adults who underwent a cervical spine MRI at our institution were examined.

We defined C7 spondylolisthesis as being 2mm or more anterior slippage of the C7 vertebral body on sagittal T2-weighted MRI.
Patients and Methods

In patients with C7 spondylolisthesis, the existence of spinal cord compression was evaluated on axial T2-weighted MRI.

compression ( - )

compression ( + )
Patients and Methods  - 3 -

In patients with C7 spondylolisthesis, we also evaluated C8 radiculopathy based on following neurological findings in the absence of spinal cord compression at C6-7 level.

• Unilateral upper extremity symptom
  - motor weakness : intrinsic muscles, EDC, triceps
  - sensory disturbance : ulnar side of hand & forearm
• Spurling test
• Interscapular pain

EDC : Extensor Digitorum Communis
Results - 1 -

Prevalence of C7 spondylolisthesis

C7 spondylolisthesis 2.8% (15 / 530 cases)

Trauma ( - ) Rheumatoid Arthritis ( - )

Degree of slippage

<table>
<thead>
<tr>
<th>&lt;3mm</th>
<th>≥3mm</th>
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<tbody>
<tr>
<td>10 / 15</td>
<td>5 / 15</td>
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Age distribution:

- 30s: 20s, 30s, 40s, 50s, 60s, 70s, 80s, 90s
- %: 0, 2, 4, 6, 8, 10, 12, 14, 16

<3mm:

- Trauma: 14.8% (4 / 27)
- Rheumatoid Arthritis: 5.8% (7 / 121)
- 3% (4 / 128)

≥3mm:
Results - 2 - Spinal cord compression

On sagittal T2-weighted MRI

Only one case
(slippage of 5mm)

On axial T2-weighted MRI

33.3% (5 / 15 cases)
average slip 3mm (2-5)
Five of the 15 patients (33.3%) had slippage of 3mm or more. Four of the 15 patients (26.7%) exhibited C8 radiculopathy, and each had slippage of 3mm or more.

<table>
<thead>
<tr>
<th>C8 radiculopathy</th>
<th>Slippage</th>
<th>&lt;3mm</th>
<th>≥3mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>0</td>
<td>4</td>
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<tr>
<td>-</td>
<td>10</td>
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Fisher’s exact probability test, P<0.005
Discussion

The prevalence of degenerative spondylolisthesis in the cervical spine. Scout lateral cervical spine radiographs prior to a barium swallow study. Total: 9/174 (5.2%), C7-T1: 1/174 (0.57%).

In this study, the overall prevalence of C7 spondylolisthesis was 2.8% using cervical spine MRI, and the prevalence increased with age.

Upright-seated MRI was found to be superior to recumbent MRI of the spine in cases of posterior disc herniation and anterior spondylolisthesis.

Because MRI was performed in supine position, anterior slippage of C7 may have been underestimated in this study. If examination had been performed in sitting or standing position, the prevalence of C7 spondylolisthesis might have been higher.
Motor deficits, especially in the C8 innervated muscles, can lead to serious long-term disability. Therefore, in patients with C8 weakness, especially in the dominant hand, surgery should be considered strongly.

When slippage was 3mm or more, C8 radiculopathy was often observed. (80%) Therefore, in patients with C7 spondylolisthesis, findings beyond those of myelopathy and C8 radiculopathy should also be noted.

**Conclusions**

1. In MRI study, the prevalence of C7 spondylolisthesis was 2.8%, and the prevalence increased with age.

2. When slippage was more than 3mm, C8 radiculopathy was observed in 80%.

None of the authors has any potential conflict of interest.