Effect of Preoperative Sagittal Balance on Cervical Laminoplasty Outcomes in Elderly Patients Aged ≥65 Years

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Subjects

- 87 patients who underwent cervical laminoplasty for cervical compression myelopathy
- 56 men, 31 women
- Mean age 64 (30-89) yrs
- Follow up 27 (12-84) mo
Methods

- Radiographic analysis
  - C2/7 Cobb angles and range of motion (ROM)
  - C7–sagittal vertical axis (SVA) (cm)

- Outcomes
  - Japanese Orthopedic Association (JOA) scores
  - Short Form 36 (SF-36) Health Survey [physical and mental summary scores (PCS and MCS, respectively)]
  - Neck Disability Index (NDI)
Statistical analysis

- Wilcoxon signed rank test
- Mann–Whitney U test
- Spearman’s rank correlation coefficient

Significant when $p < 0.05$
Results 1

C7-SVA (preop)

- 2.8 cm (-4.0 cm ~ 20.0 cm)
- positive correlation with age ($\rho = 0.36$)

- C7-SVA $> 5$ cm  23 pts
- C7-SVA $\leq 5$ cm  64 pts
Results 2

46 pts aged ≥65 years

- C7-SVA ≤ 5 cm  28 pts
- C7-SVA > 5 cm  18 pts
Results 3 (46 pts aged ≥ 65 years)

<table>
<thead>
<tr>
<th></th>
<th>C7-SVA≤5 cm</th>
<th>C7-SVA&gt;5 cm</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=28</td>
<td>N=18</td>
<td></td>
</tr>
<tr>
<td>Age(y)</td>
<td>70.1</td>
<td>72.7</td>
<td>0.13</td>
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<tr>
<td>Sex</td>
<td>M:F 16:10</td>
<td>11:8</td>
<td>0.78</td>
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<tr>
<td>Follow-up (mo)</td>
<td>29.4</td>
<td>23.5</td>
<td>0.34</td>
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<tr>
<td>C2C7 Cobb</td>
<td>pre 7.7</td>
<td>9.8</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>post 5.4</td>
<td>8.3</td>
<td>0.55</td>
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<tr>
<td>ROM</td>
<td>pre 41.3</td>
<td>39.6</td>
<td>0.75</td>
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<td></td>
<td>post 23.0</td>
<td>22.5</td>
<td>0.90</td>
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<tr>
<td>JOA score</td>
<td>pre 10.2</td>
<td>9.2</td>
<td>0.09</td>
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<tr>
<td></td>
<td>post 13.4</td>
<td>11.8</td>
<td>0.03</td>
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<tr>
<td>recovery rate</td>
<td>44%</td>
<td>36%</td>
<td>0.43</td>
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<tr>
<td>NDI</td>
<td>pre 38.3</td>
<td>45.6</td>
<td>0.17</td>
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<tr>
<td></td>
<td>post 30.4</td>
<td>38.9</td>
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<tr>
<td>PCS</td>
<td>pre 19.4</td>
<td>11.5</td>
<td>0.15</td>
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<tr>
<td></td>
<td>post 28.9</td>
<td>13.6</td>
<td>0.01</td>
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<tr>
<td>MCS</td>
<td>pre 45.6</td>
<td>49.3</td>
<td>0.35</td>
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<tr>
<td></td>
<td>post 48.1</td>
<td>53.2</td>
<td>0.25</td>
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</table>
Discussion

Poorer surgical outcomes after posterior surgery

- T1 slope as a predictor of kyphotic alignment change after laminoplasty in patients with cervical myelopathy
  Kim et al., Spine, 2013

- The impact of standing regional cervical sagittal alignment on outcomes in posterior cervical fusion surgery
  Tang et al., Neurosurgery, 2012

- This study
  Patients with C7-SVA > 5 cm had poorer surgical outcomes
Why poorer outcomes in patients with a C7-SVA of > 5 cm?

Two possible reasons

1. The existence of sagittal imbalance led to poorer scores?
   - Preop scores were inferior (not significantly) in those with a C7-SVA of > 5 cm
   - Correction surgery comes first in some patients?

2. Neurological recovery was inferior after posterior decompression?
   - Significant difference only postop supports this idea
   - Anterior or posterior fixation surgery?
Conclusion

Surgical outcomes after cervical laminoplasty can be affected by sagittal imbalance in patients aged $\geq 65$ years.
Disclosures

Yasushi Oshima, none