Relationship between Sedimentation sign and Morphological Grade in Lumbar Spinal Stenosis

Laudato P, Kulik G., Pierzchala K., Schizas C.

Orthopedics, Centre Hospitalier Universitaire Vaudois and the University of Lausanne, Switzerland
Introduction

- No consensus about classification of lumbar spinal stenosis (LSS)

- Usually: Dural sac cross-sectional area (DSCA) on MRI is used:
  - <75 mm$^2$: absolute stenosis
  - 75 -100 mm$^2$: relative stenosis
  But, no clinical correlation

- 2 new morphological approaches:
  - Morphological Grade
    Schizas C et al, Spine, 2010
  - Nerve Root Sedimentations sign
    Barz T et al, Spine, 2010
Introduction: Morphological Grade (MorphG)

- Prognostic value:
  - Grade C&D: strong predictors of failure of conservative measures (OR: 30)
  - Grade A to B: unlikely need surgery (FU > 5 years)

Schizas C et al, Spine, 2010
Introduction: Nerve Root Sedimentation Sign (SedS)

- Mid height vertebral body above/below maximal stenosis
- Exception:
  - nerve roots leaving level below stenosis
  - L5/S1 excluded (S1/S2 roots “inhibit sedimentation”)

"Absence of nerve root sedimentation in at least 1 transverse MRI scan, at a level above or below, disregarding the location of the scan within the level and its proximity to the maximal stenosis »

SedS discriminates patient with and without LSS:
- SedS + ve 94% in the LSS group
- SedS + ve 0% in the LBP group

Barz T et al, Spine, 2010
Purpose of the Study

• Study relationship between
  – Morphological grade (MorphG)
  – Sedimentation Sign (SedS)

• Defining likelihood to warrant surgery based on
  – SedS
  – MorphG
### Material and Methods

<table>
<thead>
<tr>
<th><strong>Type of Study</strong></th>
<th>Retrospective on prospective cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between</strong></td>
<td>2007-2013</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>137 patients</td>
</tr>
<tr>
<td><strong>3 groups</strong></td>
<td>1. LSS treated conservatively (41)</td>
</tr>
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<td></td>
<td>2. LSS treated surgically (69)</td>
</tr>
<tr>
<td></td>
<td>3. LBP: group control (27)</td>
</tr>
<tr>
<td><strong>Women - Men</strong></td>
<td>79 - 58</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>70 yrs (range, 36 to 89)</td>
</tr>
<tr>
<td><strong>Measure</strong></td>
<td>• Stenosis MorphG at all levels (A;B;C;D)</td>
</tr>
<tr>
<td></td>
<td>• SedS (above and/or below the maximal stenosis at pedicle level, + ve or – ve)</td>
</tr>
</tbody>
</table>
Results:

Presence of SedS in the 3 groups:

<table>
<thead>
<tr>
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<th>Surgery (69)</th>
<th>No Surgery (41)</th>
<th>LBP (27)</th>
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<tbody>
<tr>
<td>PSedS</td>
<td>46</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>NSedS</td>
<td>23</td>
<td>25</td>
<td>25</td>
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Surgery vs conservative treatment

- SedS +ve: OR: 3.13
- C&D grade: OR: 47

Morphological grade in the 3 groups:

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<th>LBP (27)</th>
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<tr>
<td>MorphG C-D</td>
<td>67</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>MorphG A-B</td>
<td>2</td>
<td>24</td>
<td>22</td>
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Surgery/No Surgery
- Sensibility: 66%
- Specificity: 60%
- VPP: 74%
- VPN: 52%
- OR: 3.13 p < 0.01

LSS/LBP
- Sensibility: 56%
- Specificity: 93%
- VPP: 97%
- VPN: 34%

Surgery/No Surgery
- Sensibility: 97%
- Specificity: 59%
- VPP: 79%
- VPN: 92%
- OR: 47 p < 0.01

LSS/LBP
- Sensibility: 76%
- Specificity: 92%
- VPP: 94%
- VPN: 45%
### Results:

<table>
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<th>Morph G</th>
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<tr>
<td>A</td>
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<tr>
<td>D</td>
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- With high MorphG, the SedS are more positive
- Between two grade C-D, the SedS is always positive
Example: MorphG C - Neg. SedS

L4-L5: Grade C stenosis - antelithesis

L4: Neg. SedS

L5: Neg. SedS
Discussion & Conclusion

- Macedo et al:
  - Relation between DSCA and SedS
- Fazal et al:
  - Relation between SedS and level to operate
- Our study is the only that looks into the relation between MorphG and the SedS
- Certain correlation between MorphG and SedS
- Limitations of our Study:
  - follow up <10 years
    - LSS natural history?
Discussion & Conclusion

- MorphG carries a higher prognostic value than SedS

- SedS: cannot discriminate between
  - non surgical candidates
  - surgical

- SedS cannot guide as to which level need decompression

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OR 47 vs 3.13
Ref:


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