Treatment of symptomatic degenerative spondylolisthesis at L4/L5 with LLIF without decompression

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Disclosure:

P. Campbell: Consultant for 4 Web and Titan Spine
Background

- LLIF has greatest potential for indirect decompression in degenerative spondylolisthesis (DS)

Challenges:
- Narrower safe working zones inferiorly in the lumbar spine.
- Anterolisthesis serves to exacerbate risk of neurological injury.
- High riding crest may make exposure difficult.
- Grade II L4/5 XLIF often considered the “worst case scenario” for transpsoas surgery.
Methods

- Inclusion: Consecutive patients with grade 1 or 2 degenerative spondylolisthesis at L4-5 treated with 1 or 2-level LLIF between July 1, 2016 – July 1, 2017

- Outcomes were collected preoperatively and post-operatively at 2 weeks, 6 weeks, 3, 6, and 12 months. (ODI, SF-12 PCS & MCS)

- Radiographic assessments and neurological assessments were completed at each visit

- Surgery:
  - LLIF to the L4-L5 disc space via transpsoas approach
  - Surgeon preference of titanium or polyetheretherketone cage, and graft material
  - Neuromonitoring was performed on all cases
  - Indirect decompression ONLY, with supplemental posterior fixation with pedicle screws
## Baseline and OR Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Patients</td>
<td>18</td>
</tr>
<tr>
<td>Age</td>
<td>64 ± 10.5</td>
</tr>
<tr>
<td>BMI</td>
<td>34 ± 7</td>
</tr>
<tr>
<td>Female</td>
<td>11 (61%)</td>
</tr>
<tr>
<td>Grade of spondylolisthesis</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>15 (83%)</td>
</tr>
<tr>
<td>2</td>
<td>3 (17%)</td>
</tr>
<tr>
<td>Levels treated</td>
<td></td>
</tr>
<tr>
<td>L3-L5</td>
<td>2 (11%)</td>
</tr>
<tr>
<td>L4-L5</td>
<td>16 (89%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior Instrumentation</td>
<td>100%</td>
</tr>
<tr>
<td>Bilateral pedicle screws</td>
<td>89%</td>
</tr>
<tr>
<td>Unilateral pedicle screws</td>
<td>11%</td>
</tr>
<tr>
<td>Additional decompression</td>
<td>0%</td>
</tr>
<tr>
<td>EBL</td>
<td>113 ± 79</td>
</tr>
<tr>
<td>Op time</td>
<td>165 ± 58</td>
</tr>
<tr>
<td>Cage width at L4-L5</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>2 (11%)</td>
</tr>
<tr>
<td>22</td>
<td>14 (78%)</td>
</tr>
<tr>
<td>26</td>
<td>2 (11%)</td>
</tr>
</tbody>
</table>
Complete reduction of spondylolisthesis (<1mm) in 13/18 (72%) patients.
Results

- Anterior thigh dysesthesia identified on 6/18 (33%) patients, all resolved by 6 months post-operative
  - Thigh dysesthesia contralateral to exposure identified in 1 patient
  - Sensory loss ipsilateral to exposure and psoas manipulation identified in 4 patients

- Mild transient hip weakness in one patient, resolved by 4 weeks post-operative

- No intraoperative complications

- No 90-day readmissions

- No hardware failures, or pseudoarthrosis requiring additional surgical intervention

- One patient received outpatient treatment for atrial fibrillation
3 month follow-up showed 29.7% improvement from preop
6 month follow-up showed 53.0% improvement from preop
Clinical Results

Mean SF-12 PCS

- Preop: 34.7
- Immediate: 34.2
- 6 wks: 38
- 3 mo: 37.8
- 6 mo: 40.1

Mean SF-12 MCS

- Preop: 43.4
- Immediate: 40.3
- 6 wks: 46.5
- 3 mo: 48.1
- 6 mo: 48.1
Discussion

- LLIF literature rates of neurological changes varies
  - Our study included 33% anterior thigh numbness or dysesthesia, but all were resolved by 6 months

- Helpful strategies for reducing neurological injury:
  - minimal table break
  - an initial look and see approach
  - clear identification of the plexus
  - minimal expansion of the retractor
  - mobilization of any transverse sensory nerves
  - psoas dilation times of less than 20 minutes
Conclusion

- LLIF without decompression is safe and effective to treat grades 1 and 2 spondylolisthesis at L4-L5
- Rates of post-operative complications are low if lateral access principles are followed
- A thorough understanding of the lateral technique and regional anatomy are critical