Degenerative Spondylolisthesis

Minimally Invasive Surgery is the way to go

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Disclosures

Entity Consulting Advisory Board Royalties Research Grant
Medtronic X X
Stryker X
Wright X
L-Flow X
Smith X
CeramTec X
Stryker X
Mizu X
Smithy X
RT X
LSRS X X
CSRS X X
Degen Nonop

Spondy Degen
Operative
Decomp Decomp/Fusion
Weight Loss ESI
STOP Smoking
PT Instrumentation
No Instrumentation
Interspinous Spacers
MIS Open

ALIF/PLIF/PSF
TLIF/PLIF
PLF

1
200 cases

Degenerative

70%

75 yo
Degrad path
Neurogenic claudication

> 50%

200 cases × $40,000
$8,000,000 annually
15% cut
$6,800,000

Degenerative

Deformity
Trauma/Infx

70%
20%
10%
Variations in Degen Spondy

- Disc height
- Fluid in facet joint
- Dynamic instability
- Positive sagittal balance
- Obesity
- Activity level
- Back vs. leg pain

Degenerative Spondylolisthesis

- 65 yo M
- High-level executive
- Severe right radicular pain
- Mild LBP
- Failed conservative management
- Normal physical exam
Goals of surgical treatment

- Degenerative Spondylolisthesis
  - Foraminal/canal decompression
  - Stabilize lumbar instability
  - Achieve solid fusion
  - Quicken recovery time
  - Improve clinical outcomes
  - Avoid reoperations

- Sustainable solutions

National Trends in the Use of Fusion Techniques to Treat Degenerative Spondylolisthesis

- ABOS database
  - 1999-2011
  - 96% of degenerative spondy cases with fusion
  - Increase in interbody fusion %
    - 1999-2001 13.6%
    - 2009-2011 32%

Costs of surgery

- Perioperative
  - OR time
  - EBL / Blood transfusions
  - Implant costs
  - Surgical supplies

- Postoperative
  - LOS
  - Rehabilitation
  - Laboratory
  - Pharmacy
  - Respiratory supplies
• Complications
  – Infection
  – Durotomy
  – Neuro deficit
  – Medical
  – Anesthetic related
• Reoperations
• Rehab
• Narcotic use

Costs of surgery

Postoperative
Indirect

TLIF for degenerative spondylosis
45 pt, single institution
2-year outcomes
- VAS
- Leg pain VAS
- ODI
- Medical resource utilization
- Missed work
- EQ-5D
• Medicare fee scheduling
  - Workday losses (self-reported wage rates)

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Cost-effectiveness of translumbar interbody fusion for Grade I degenerative spondylolisthesis
Clinical article

- 2-year gain of 0.86 QALYs
  - Mean cost $36,836
  - Total cost per QALY gained
  - $42,854
  - Below the $50k threshold

Hospital costs for 1-level fusion

<table>
<thead>
<tr>
<th>Study</th>
<th>MIS</th>
<th>Open</th>
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</thead>
<tbody>
<tr>
<td>Wang et al</td>
<td>$70,159</td>
<td>$78,444</td>
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<tr>
<td>McGirt et al</td>
<td>$29,187</td>
<td>$29,947</td>
</tr>
<tr>
<td>Singh et al</td>
<td>$33,276</td>
<td>$37,328</td>
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</tbody>
</table>
Postoperative Perioperative Indirect Costs of surgery

- Premier Perspective Database, 5170 pt with P/TLIF
- 292 (5.6%) pt with SSI
- Open fusion higher rate of SSI (OR 1.469, 95% CI 0.959-2.250)
- Cost: $15,817 per SSI
- Direct cost savings of $38,400 per 100 P/TLIF procedures (2-level)

Minimally Invasive Decompression Versus X-Stop in Lumbar Spinal Stenosis
- Prospective multicenter RCT, 96 patients, 1- and 2-level stenosis
- Secondary surgeries increased in X-stop group
- OR of 6.5
- Higher costs for X-stop

Lateral interbody fusion
- Novel pedicle screw trajectory
- Starting point
  - 3 mm medial to the lateral pars at the inferior border of TP
- Short screw
  - 25-30 mm
  - Cortical pitch
- Trajectory is found with a burr
  - 10° lateral
  - 30° cephalad
- 5.0-mm diameter screw

- BMD measured using HU on CT scan
- 180 patients
  - Evenly distributed by decade of life, gender
  - HU measured at end fixation point for cortical and traditional pedicle screw
- Patients with osteoporosis identified
### Value-based Decision Making

<table>
<thead>
<tr>
<th></th>
<th>DLIF</th>
<th>TLIF</th>
<th>Cortical screws</th>
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</thead>
<tbody>
<tr>
<td>OR time</td>
<td>156 minutes</td>
<td>118 minutes</td>
<td>96 minutes</td>
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<tr>
<td>EBL</td>
<td>75 cc</td>
<td>95 cc</td>
<td>130 cc</td>
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<tr>
<td>LOS</td>
<td>2 days</td>
<td>2 days</td>
<td>1 days</td>
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<tr>
<td>Costs</td>
<td>$81,145</td>
<td>$70,133</td>
<td>$63,290</td>
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</tbody>
</table>
Degen Spondy: The continuum of treatment

< 50 yo 50-65 yo 65-85 yo > 85 yo
Anterior/posterior
Anterior Fusion TLIF LIF PL Fusion Decompression Only

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