The effect of surgical and non-surgical treatment of longitudinal outcomes of lumbar spinal stenosis (LSS) over 10 years. Yuchiao Chan, PhD, Daniel Singer, MD, Yen A Wu, MPH, Robert B. Keller, MD and Steven J. Atlas, MD, MPH JAGS 53: 785-792, 2005

PICO

Patients: Pts with spinal stenosis

Intervention: Initial Surgical or nonsurgical treatment follows up

Comparison: Effect of treatment over time within cohorts.

Outcomes: Benefit in overall health in 10 years after intervention

Background

Few studies have assessed long term outcomes of patients with LSS (Lumbar Spinal Stenosis), and these generally have reported declines in magnitude of initial surgery benefits. Musculoskeletal disorders are increasing as the population ages (radiculopathy and low back pain).

Hypothesis Surgical intervention might not benefit patient symptoms in the long term (10 years), compare to short term.

Objective: To assess the relative effect on initial surgical and no surgical treatment on longitudinal outcomes of patients with lumbar spinal stenosis over a 10 years follow up period.

Interest: Low back pain, leg symptoms, back specific functional Status and satisfaction to current state

Primary outcome: Roland Morris Disability Score (Range 0-23 +/- 5D) at baseline

Design: Prospective observational cohort study using longitudinal analytical techniques, and relative effect of treatment over time defines: short (0-1 year), med (1-5 yrs) and long term (>5yrs).

Measurements:

Data obtain at baseline, 3,6,12 months and then yearly with a mailed questionnaire including patient reported: Sx back pain, leg Sx, back pain specific functional status and satisfaction. (General mixed models)

<table>
<thead>
<tr>
<th>Initially Treated</th>
<th>P - Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>Non surgery</td>
</tr>
<tr>
<td>77*</td>
<td>67**</td>
</tr>
<tr>
<td>Subsequent surgery</td>
<td>23%</td>
</tr>
<tr>
<td>10 year survival rate</td>
<td>69%</td>
</tr>
<tr>
<td>Rx mod t severe findings</td>
<td>83%</td>
</tr>
<tr>
<td>Modify Roland Score at baseline</td>
<td>16+/- 4.2</td>
</tr>
<tr>
<td>Past treatment Epidural steroids</td>
<td>33.80%</td>
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<tr>
<td>Comorbid illness, yes</td>
<td>59.70%</td>
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</tbody>
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*Worse baseline Sx, functional status  **Greater improvement of Sx, higher satisfaction scores

Participants: 144 W/ LSS (at least 1x F/u) from community base specialist practice in Maine.
The relative benefit of surgical and non-surgical treatment in secondary analysis favors surgical treatment but differences in leg Sx frequency scores didn’t reach statistical differences in Mid and long term period (Pg. 790) - however, this may largely be due to the reduced sample size at mid /long term follow up. Fig. 2, suggest clinical significance was maintained even at long term follow up.

**Measurements:**
Data obtained at baseline, 0, 3, 6, 12 months and then yearly with a mailed questionnaire including patient reported: Sx back pain, leg Sx, back pain specific functional status and satisfaction. (General mixed models)

**Results**
- Surgical treatment is associated with significantly better outcomes over time but that the magnitude of the benefit diminished over long term follow up (>5yrs)
- There were similar survival rate amounts the surgical and non-surgical interventions patients.
- Regardless of initial Tx chosen (Sx Vs non surgery) those who needed subsequent Surgery intervention (due to poor response to the initial Tx) had worse outcomes compared with the pts who did not need subsequent surgery (this is an expected finding)

**Critique**

**Pros:**
- Showed statistical significant even when cross matched
- Prospective follow up
- Multivariate models examine relative treatment group over time evaluation patient data in “real time “instead of a cross sectional or two time points.

**Cons:**
- Not RCT, observational, Small. (Although there are some ongoing as we speak)
- Surgical tx’ed pts had worse Sx and worse function at baseline
- The relative outcome cannot be definitely stated due to received Tx or immeasurable cofounders.
- Small sample size high mortality might interfere to identify Tx differences. Older Pt Study was under power for long term outcomes
- Very few underwent fusion Tx (no compare outcomes with Decompression laminectomy alone or Surgery)

**Implications**
- Need future intervention to assess effect of other comorbidities over time on outcomes, using more co morbidities measures.
- Patients initially treated surgically had more severe Sx and greater functional impairment Vs non surgical approach

<table>
<thead>
<tr>
<th>As treated analysis</th>
<th>P value</th>
</tr>
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<tbody>
<tr>
<td>Treatment group / time period</td>
<td>0.01*</td>
</tr>
<tr>
<td>Freq Low back pain</td>
<td>0.15</td>
</tr>
<tr>
<td>RFS***</td>
<td>0.33</td>
</tr>
</tbody>
</table>

*Leg Sx freq. satisfaction with current state
**Rolan Functional Status
Conclusion
-Patient with LSS, initial surgical treatment showed greater improvement in low back pain, leg Sx, functional status and satisfaction than initial non surgical Tx in 10 yrs, probably due to underpowered study-Leg Sx frequency and back related Fx problems better in surgical cohort (overal)