

Effect of 90-day Complications on Cost-utility following Lumbar Decompression with and without Fusion for Degenerative Spine Disease

Scott L. Parker MD; Silky Chotai MD; Ahilan Sivaganesan MD; John Alexander Sielatycki MD; Joseph Wick; David P Stonko;

Matthew J. McGirt MD; Clinton J. Devin MD

[Institution]

Click To Add Logo



Introduction

Current healthcare system is transitioning from the “fee-for service” to “pay-for performance” model. With this paradigm shift, providers and payers are shifting from quantity to quality, focusing on cost-effective and high quality patient care. Understanding the effect of complications on cost and effectiveness of surgery is vital to understanding its overall impact. We evaluated the effect of complications on cost-utility after lumbar decompression with/ without fusion for degenerative spine disease.

Methods

407 consecutive patients undergoing elective surgery for degenerative lumbar pathology were enrolled into prospective longitudinal registry. PROs were recorded at baseline, 3-months, 12-months, and 24-months post-operatively: ODI, NRS-back and leg pain(BP, LP), EQ-5D. Two-year back-related medical resource utilization, missed work, and health state values(quality-adjusted life years[QALYs]) were assessed. Two-year resource use(direct cost) and patient/caregiver workday losses(indirect cost) were calculated. Mean total(direct+indirect) 2-year cost/QALY gained was assessed. Patients were stratified into cohorts based on whether 90-day major

Results

There was significant mean improvement in pain, disability, and quality of life for total cohort 2-years post-operatively($p < 0.0001$), Table 1. Total 24-month cost was significantly lower in patients without vs. with complication for decompression alone(\$16,133±8,008 vs. \$21,322±9,029, $p = 0.09$) and decompression+fusion(\$37,674±11,686 vs. \$40,825±11,570, $p = 0.03$). QALY gained at 24-months was similar in patients without/with complication for decompression alone(0.68 ± 0.70 vs. 0.72 ± 0.63 , $p = 0.81$) and decompression+fusion(0.59 ± 0.60 vs. 0.46 ± 0.60 , $p = 0.21$). Cost/QALY gained was reduced in patients without vs. with complication for decompression alone(\$23,725/QALY vs. \$29,614/QALY, $p = 0.05$) and decompression+fusion(\$63,854/QALY gain vs. \$88,750/QALY, $p = 0.11$), Table 2.

Conclusions

Lumbar surgery provided significant improvement in pain, disability, and quality of life at 24-months regardless of occurrence of complication within 90-days post-operatively. Occurrence of complication resulted in significantly increased cost at 24-months. Cost-

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Describe the importance of complications on cost, effectiveness, and cost-utility following lumbar surgery

References

Table 1

| PROs | Baseline | 24-month | P-value |
|------------------------|-------------|-------------|----------|
| <i>No Complication</i> | | | |
| ODI | 48.2 ± 15.6 | 24.7 ± 18 | <0.0001* |
| EQ-5D | 0.53 ± 0.22 | 0.77 ± 0.20 | <0.0001* |
| NRS - BP | 6.3 ± 2.7 | 3.7 ± 3.1 | <0.0001* |
| NRS - LP | 6.7 ± 2.7 | 3.0 ± 3.3 | <0.0001* |
| SF-12 PCS | 28.4 ± 9.1 | 39.8 ± 13.4 | <0.0001* |
| SF-12 MCS | 47.3 ± 11.8 | 52.2 ± 10.4 | <0.0001* |
| <i>Complication</i> | | | |
| ODI | 51.5 ± 14.3 | 29.6 ± 18 | <0.0001* |
| EQ-5D | 0.53 ± 0.19 | 0.73 ± 0.17 | <0.0001* |
| NRS - BP | 7.4 ± 2.1 | 3.9 ± 2.8 | <0.0001* |
| NRS - LP | 6.3 ± 3.2 | 3.2 ± 3.3 | <0.0001* |
| SF-12 PCS | 26.2 ± 7.6 | 36.2 ± 12.1 | <0.0001* |
| SF-12 MCS | 49.4 ± 12.5 | 53.8 ± 12.5 | 0.04* |

Patient-reported Outcomes 24 month after surgery for degenerative lumbar spine disease

Table 2

| | No complications (n=155) | Complications (n=12) | p-value |
|---------------------------------|-----------------------------|-------------------------|---------|
| Decompression alone | | | |
| QALY gain 24m | 0.68 ± 0.70 | 0.72 ± 0.63 | 0.81 |
| Total Cost 24m | \$16133 ± \$8008 | \$21322 ± \$9029 | 0.09 |
| Direct cost 24m | \$11105 ± \$5685 | \$14546 ± \$5397 | 0.04 |
| Indirect cost 24m | \$5028 ± \$1319 | \$6776 ± \$827 | 0.57 |
| Cost-utility 24m total | \$23,725/QALY | \$29,614/QALY | 0.05 |
| Decompression and fusion | | | |
| QALY gain 24m | 0.59 ± 0.60 | 0.46 ± 0.60 | 0.21 |
| Total Cost 24m | \$37674 ± \$11686 | \$40825 ± \$11570 | 0.03 |
| Direct cost 24m | \$31539 ± \$9689 | \$35249 ± \$10609 | 0.02 |
| Indirect cost 24m | \$6135 ± \$6546 | \$5576 ± \$5556 | 0.65 |
| Cost-utility 24m total | \$63,854/QALY | \$88,750/QALY | 0.11 |

Comparison of QALYs gained, cost, and cost-utility after decompression alone and decompression with fusion for patients with and without complications.