A ccording to the results of a Canadian study presented during the 2013 annual meeting of the North American Spine Society, routine spine surgery is neither more prone to “fail” nor to be more dangerous than popular knee and hip replacement surgeries. The study, “Comparative Outcomes and Cost Utility Following Surgical Treatment of Focal Lumbar Spinal Stenosis Compared with Osteoarthritis of the Hip or Knee: Part 1: Long-Term Change in Health-Related Quality of Life and Part 2, Estimated Lifetime Incremental Cost-Utility Ratios,” was awarded a 2013 “Outstanding Paper Award” from The Spine Journal.

Quality of life changes Part 1 of the single-center, retrospective, longitudinal, matched-cohort study looked at improvements in health-related quality of life (HRQL) in patients who had a primary one- to two-level spinal decompression (with or without instrumented fusion) for focal symptomatic spinal stenosis (FSS) and a minimum of 5 years follow-up. Researchers compared these results to those experienced by patients with osteoarthritis (OA) who had total joint replacements.

The primary outcome measure was the change from baseline to last follow-up in SF-36 physical component summary (PCS) scores and mental component summary (MCS) scores. Data were collected prospectively and at follow-up. Three age- and sex-matched patient cohorts were included in the study:

- patients who had primary one- or two-level spinal decompression with or without instrumented fusion for FSS (n = 99)
- patients with hip OA who had primary total hip arthroplasty (THA) (n = 99)
- patients with knee OA who had primary total knee arthroplasty (TKA) (n = 99)

All patients were followed for a minimum of 5 years. Follow-up rates ranged from 79 percent (FSS cohort) to 92 percent (THA cohort).

Based on a linear regression analysis, both SF-36 PCS and MCS scores improved significantly for all groups at median 5 years and at the last follow-up (Table 1). The proportion of patients who reached the minimal clinically important difference (MCID) for the PCS score did not differ significantly among cohorts, and ranged from 57 percent for the TKA group to 61 percent for the FSS group to 68 percent for the THA group at the last follow-up.

After adjusting for baseline age, sex, body mass index, PCS, and MCS, researchers found no statistically significant difference in the change from baseline PCS or MCS to last follow-up among the groups. Compared to patients who had spine surgery and those who had TKA, patients who had THA had a significantly greater change from baseline in both PCS and MCS scores at a median of 5 years. The researchers concluded that surgery for all three conditions (FSS with or without spondylolisthesis, hip OA, and knee OA) resulted in significant improvements in HRQL sustained to a mean of 7 to 8 years with a minimum 5-year follow-up. The long-term change in HRQL from baseline and the proportion of patients reaching MCID for PCS was comparable across all three cohorts at that time as well.

“Due to misplaced fear and misinformed therapies, millions of patients are living with daily pain from spinal stenosis, a very treatable condition,” said Emeric Truumees, MD, NASS annual meeting program cochair. “This study demonstrates that properly indicated and performed spine surgery has a high long-term success rate, similar to that of popular knee and hip replacement surgeries.”

Cost effectiveness Part 2 of the study looked at the cost effectiveness of the three procedures and was based on long-term health status data at a median of 5 years after the surgical intervention. Researchers used an incremental cost-utility analysis from a hospital perspective, based on prospectively collected outcomes and retrospectively collected costs. Both direct and indirect perioperative costs were used in the analysis.

Patient outcomes were collected preoperatively and annually for a minimum of 5 years, using the SF-36 survey. Utility was modeled over a lifetime, and quality-adjusted life years (QALYs) were determined using the median 5-year health status data. Cost per QALY gained was calculated by estimating the mean incremental lifetime costs and QALYs for each diagnostic group (FSS, THA, and TKA) after discounting costs and QALYs at 3 percent. Adjustments were made for revision rates, differences in primary and revision surgery costs, confidence interval utility scores, and variable inpatient rehabilitation rates for THA and TKA. At a median of 5 years, the incremental cost-utility ratio for each intervention was as follows:

- $21,702/QALY for THA ($5,682/QALY lifetime)
- $28,595/QALY for TKA ($6,489/QALY lifetime)
- $12,271/QALY for spinal decompression ($2,994/QALY lifetime)
- $35,897/QALY for spinal decompression with fusion ($10,806/QALY lifetime)

According to the authors, “Surgical management of primary osteoarthritis of the spine, hip, and knee results in durable cost-utility ratios that are well below accepted thresholds for cost-effectiveness.” The authors noted that, although the revision rate for FSS surgery (20.2 percent) was significantly higher than that for THA (3 percent) and TKA (8.1 percent), median 3-year and lifetime cost-utility measures were similar, based on “the limited perspective of a public health insurance system.”

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Disclosure information:
- Dr. Rempersaud—Medtronic, Canadian Journal of Surgery
- Canadian Spine Society for Minimally Invasive Spine Surgery
- Dr. Lewis—Medtronic, Sosfamor Danek; Stryker; Scoliosis Research Society
- Dr. Gandhi and Coyte—no conflicts
- Dr. Davey—Biomet; Smith & Nephew
- Dr. Mahomed—Bayer; Smith & Nephew; Biomet; Stryker
- Ms. Tso and Mr. Walker—no information

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**TABLE 1: MEAN CHANGE FROM BASELINE TO LAST FOLLOW-UP**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Spinal Surgery</th>
<th>Total Hip Arthroplasty</th>
<th>Total Knee Arthroplasty</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Component Score</td>
<td>8.5</td>
<td>12.3</td>
<td>8.3</td>
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<tr>
<td>Mental Component Score</td>
<td>6.4</td>
<td>7.0</td>
<td>4.9</td>
<td>&lt; 0.02</td>
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</tbody>
</table>

Researchers found that surgery resulted in significant improvements in PCS and MCS scores for all three groups, with a strong trend in favor of greater sustained change in the PCS of THA over the other two groups.

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- A single-center, retrospective, longitudinal, matched-cohort study was used to compare the results of surgery for treating osteoarthritis (OA) in the spine (focal symptomatic spinal stenosis), hip, and knee, with a focus on quality of life changes and cost effectiveness.
- With regard to quality of life, patients in all three cohorts experienced significant improvement in both physical and mental component scores, sustained to a mean of 7 to 8 years.
- All three cohorts also had cost-utility ratios that were below accepted thresholds for cost-effectiveness.
- Spinal surgery patients had a higher revision rate than patients who had either total hip or total knee arthroplasty.

**AAOS Now** February 2014 aaosnow.org