

The Changing Healthcare Landscape of Lumbar Spinal Fusion: Two-Year Claims Database Analysis

Daryl C. Dykes¹, Jill W. Ruppelkamp², Katherine A. Corso¹, Chantal E. Holy², Caroline E. Smith¹, Michelle Costa¹

¹: Johnson & Johnson, Raynham, MA, USA;

²: Johnson & Johnson, New Brunswick, NJ, USA

BACKGROUND

- Spinal lumbar fusion has been associated with high reoperation/revision rates.
- Studies using older real-world data have reported two-year rates of about 4% to 7% and four to five year rates of about 8% to 13%^{1,2,3}.

OBJECTIVES

- To evaluate the two-year healthcare utilization associated with lumbar fusion surgery using comprehensive, contemporary data.

METHODS

Study Design: Retrospective, noncomparative cohort study of patients that had lumbar only fusion procedure.

Data Source: Merative MarketScan Commercial Claims database, covering >100 million lives, October 1, 2015 to October 31, 2020.

Study Population:

- Inclusion:** Adult (18 to 64 years) that had lumbar only fusion (identified with ICD-10 codes), ≥ two years continuous enrollment post-surgery, 180 days of healthcare enrollment prior to fusion.
- Exclusion:** Patients with fusions of other anatomic sites.

Outcomes:

- Reoperations in the lumbar spine
- Infection, defined as presence of deep infection or spinal infection
- Pseudarthrosis

Statistical Analysis:

- Descriptive analytics were conducted for all reoperations, infection and pseudarthrosis.
- Costs were inflation adjusted to 2022.
- Generalized linear models (GLM) with log link and gamma distribution and marginal analysis was used for costs.

References:

1. Deyo RA, et al. Revision surgery following operations for lumbar stenosis. *J Bone Joint Surg Am* 2011;93(21):1979-86.
2. Huang KT, et al. Differences in the outcomes of anterior versus posterior interbody fusion surgery of the lumbar spine: a propensity score-controlled cohort analysis of 10,941 patients. *J Clin Neurosci* 2015;22(5):848-53.
3. Cummings D, et al. Reoperation and Mortality Rates Following Elective 1 to 2 Level Lumbar Fusion: A Large State Database Analysis. *Global Spine J* 2022; 12(8): 1708-1714.

RESULTS

- The patient, provider and procedure characteristics of the cohort are presented in **Table 1**
 - 14,527 patients with average age 52, including 56% females, were included in the analysis.
 - The majority were treated in the inpatient setting 88%.
 - The average Elixhauser index patient comorbidity score was 1.8 (standard deviation (SD): 1.6) and ~30% patients had ≥ 3 comorbidities.
 - Degenerative disc disease and deformity were diagnosed in 88.3% and 16.6% cases, respectively.
 - One-level fusion was performed in 67% cases.
- At 2-year follow-up, new lumbar operations were performed in 11% cases, of which 57% had a diagnosis of spinal fusion complication at the time of the new lumbar procedure (Figure 1).
- Pseudarthrosis and infection were reported in 5.6% and 4.3% of all cases, respectively (Figure 1).
- The incremental healthcare costs associated with pseudarthrosis and infection, without reoperation costs, averaged \$32,302 (95% confidence interval (CI): \$20,773-\$43,831) and \$80,539 (95%CI: \$61,270-\$99,807), respectively (Figure 2).
- When reoperations were performed, costs increased by \$73,603 (95%CI: \$57,519-\$89,688) (Figure 2).

Figure 1. Two-year incidence proportion with 95% confidence interval of reoperation, pseudarthrosis and infection after lumbar fusion procedures

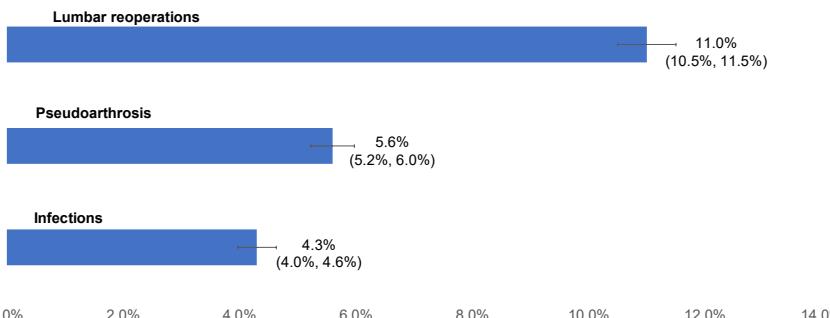
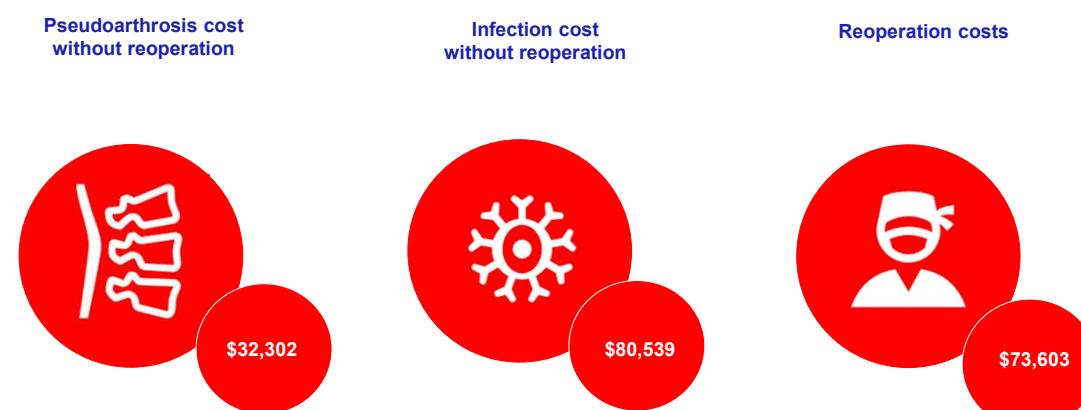


Figure 2. Incremental healthcare costs associated with pseudarthrosis, infection and reoperation



CONCLUSIONS

- For > 10% of patients, lumbar spinal surgery is associated with additional lumbar surgical interventions and high overall healthcare costs.
- Reoperation costs exceeded \$70K.