ELSEVIER

CrossMark

The Spine Journal 14 (2014) 1237–1246

THE SPINE JOURNAL

Clinical Study

How do coverage policies influence practice patterns, safety, and cost of initial lumbar fusion surgery? A population-based comparison of workers' compensation systems

Brook I. Martin, PhD, MPH[a,*], Gary M. Franklin, MD[b], Richard A. Deyo, MD, MPH[c], Thomas M. Wickizer, PhD, MPH, MSW[d], Jonathan D. Lurie, MD, MS[a], Sohail K. Mirza, MD, MPH[a]

[a]*The Dartmouth Institute for Health Policy and Clinical Practice, and the Department of Orthopaedic Surgery, Geisel School of Medicine at Dartmouth College, One Medical Center Dr., HB 7541, Lebanon, NH 03756, USA*

[b]*Washington State Department of Labor & Industries, P.O. Box 44000, Olympia, WA 98504, USA*

[c]*Department of Family Medicine, Department of Medicine, Department of Public Health & Preventive Medicine, Oregon Health & Science University, Mail Code FM, 3181 SW Sam Jackson Park Rd., Portland, OR 97239, USA*

[d]*Division of Health Services Management and Policy, College of Public Health, Ohio State University, 1841 Neil Ave., Columbus, OH 43210, USA*

Received 25 July 2012; revised 27 June 2013; accepted 20 August 2013

Abstract

BACKGROUND CONTEXT: In response to increasing use of lumbar fusion for improving back pain, despite unclear efficacy, particularly among injured workers, some insurers have developed limited coverage policies. Washington State's workers' compensation (WC) program requires imaging confirmation of instability and limits initial fusions to a single level. In contrast, California requires coverage if a second opinion supports surgery, allows initial multilevel fusion, and provides additional reimbursement for surgical implants. There are no studies that compare population-level effects of these policy differences on utilization, costs, and safety of lumbar fusion.

PURPOSE: The purpose of this study was to compare population-level data on the use of complex fusion techniques, adverse outcomes within 3 months, and costs for two states with contrasting coverage policies.

STUDY DESIGN AND SETTING: The study design was an analysis of WC patients in California and Washington using the Agency for Healthcare Research and Quality's State Inpatient Databases, 2008–2009.

PATIENT SAMPLE: All patients undergoing an inpatient lumbar fusion for degenerative disease (n=4,628) were included the patient sample.

OUTCOME MEASURE(S): Outcome measures included repeat lumbar spine surgery, all-cause readmission, life-threatening complications, wound problems, device complications, and costs.

METHODS: Log-binomial regressions compared 3-month complications and costs between states, adjusting for patient characteristics.

RESULTS: Overall rate of lumbar fusion operations through WC programs was 47% higher in California than in Washington. California WC patients were more likely than those in Washington to undergo fusion for controversial indications, such as nonspecific back pain (28% versus 21%) and disc herniation (37% versus 21%), as opposed to spinal stenosis (6% versus 15%), and spondylolisthesis (25% versus 41%). A higher percentage of patients in California received circumferential procedures (26% versus 5%), fusion of three or more levels (10% versus 5%), and bone morphogenetic protein (50% versus 31%). California had higher adjusted risk for reoperation (relative risk [RR] 2.28; 95%

FDA device/drug status: Approved (Spinal fusion implants, Bone morphogenetic proteins).

Author disclosures: ***BIM:*** Grants: NIAMS, AHRQ, NIA University of Washington (F, total); Consulting: University of Missouri - Kansas City (D). ***GMF:*** Nothing to disclose. ***RAD:*** Board of Directors: Informed Medical Decisions Foundation (B); Endowments: Kaiser Permanente (H, Paid directly to institution); Grants: NIH and AHRQ (H). ***TMW:*** Nothing to disclose. ***JDL:*** Grant: NIH (D, Paid directly to institution/employer); Stock Ownership: NewVert (A); Consulting: FzioMed (B). ***SKM:*** Nothing to disclose.

The disclosure key can be found on the Table of Contents and at www.TheSpineJournalOnline.com.

* Corresponding author. Department of Orthopaedics, Geisel School of Medicine at Dartmouth College, One Medical Center Drive, HB-7541, Lebanon, NH 03756, USA. Tel.: (603) 653–9167.

E-mail address: Brook.I.Martin@Dartmouth.edu (B.I. Martin)

http://dx.doi.org/10.1016/j.spinee.2013.08.018

confidence interval [CI], 2.27–2.29), wound problems (RR 2.64; 95% CI, 2.62–2.65), device complications (RR 2.49; 95% CI, 2.38–2.61), and life-threatening complications (RR 1.31; 95% CI, 1.31–1.31). Hospital costs for the index procedure were greater in California ($49,430) than in Washington ($40,114).

CONCLUSIONS: Broader lumbar fusion coverage policy was associated with greater use of lumbar fusion, use of more invasive operations, more reoperations, higher rates of complications, and greater inpatient costs.

Keywords: Lumbar spine fusion; Workers' compensation; Degenerative disease; Safety and quality; Readmission; Coverage and reimbursement

Introduction

Some health plans have implemented coverage restrictions to stem the increased use of lumbar fusion operations in patients with back pain associated with degenerative changes [1–3]. States have adopted a variety of coverage and reimbursement strategies for workers' compensation (WC) patients, whose outcomes are generally worse compared with non-WC patients [4,5]. However, there is little information about whether these policies modify the use, costs, or surgical safety of lumbar fusion.

Guidelines suggest that lumbar fusion may be an option for patients with severe back pain who have not improved with conservative treatment [6,7]. Restricting motion and providing structural support with instrumented fusion may be effective for some diagnoses, including degenerative spondylolisthesis, fractures, and scoliosis [8,9]. In randomized trials, although lumbar fusion is more effective than routine nonoperative care, fusion surgery is equivalent only to structured rehabilitation, but less safe and more costly [10–12]. For patients with disc herniation or spinal stenosis, decompression alone is effective [13,14]. The use of more complex lumbar procedures is associated with higher complication rates without evidence of improved functional outcomes [15–17].

One insurance policy strategy has been to limit complex lumbar procedures, including those involving adding fusion to a decompression procedure for unilateral herniated disc with radiculopathy, multiple vertebral levels, certain implanted devices, and circumferential surgical approaches. This strategy was adopted by Washington State's Department of Labor and Industries in 1996 and revised in 2006 (Table 1), based on its analyses that lumbar fusion innovations did not improve worker disability or quality of life, but increased reoperations [3,5,18]. Washington uses a prospective utilization review of lumbar fusion requests, requires x-ray imaging confirmation of spinal instability, and limits initial fusions to a single-disc level [19].

In contrast, California's WC system uses a legislated binding second opinion [20]. This policy requires an employer to authorize the procedure if the patient receives a second surgical opinion that concurs with the initial recommendation [21]. California allows additional payment for surgical instrumentation to stabilize adjacent vertebrae (screws, rods, plates, cages) and bone-growth enhancers (bone morphogenetic protein [BMP]) [22].

Hospital discharge registries allow for population-based comparisons of utilization, safety indicators, and costs between states. This information would help guide policy debate in the emerging area of cost and quality control related to spinal surgery [23,24]. Because complex fusion surgery for back pain alone has little justification on the basis of patient-reported randomized trial data, differences in safety profiles may influence patients' opinions on acceptable risk for uncertain benefit. Therefore, we compared Washington's and California's WC population data for rates of lumbar fusion surgery, complexity of surgery (use of instrumentation, fusion adjuncts, surgical approach), costs, readmissions, revision surgery, and other complications.

Methods

Data source

We examined the State Inpatient Database (SID) for California and Washington. The Agency for Healthcare Research and Quality (AHRQ) maintains SID, which is a component of the Healthcare Cost and Utilization Project (HCUP) [25]. Data from HCUP has previously been used to study spinal procedures [1,26–29]. SID is an all-payer inpatient discharge registry that provides *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) diagnoses and procedure codes, patient demographics, and hospital charges for approximately 90% of hospitals in participating states. AHRQ translates discharge information into uniform definitions to facilitate multistate comparisons. Several states, including Washington and California, include encrypted patient identifiers that allow us to identify readmissions of individual patients even if care is provided by multiple hospitals.

Sex- and age-stratified (by 5-year age increments) population data within each state were obtained from the US Census Bureau, along with estimates of the proportion of employed populations within each stratum.

Study population

We identified adults (ages 20–65) undergoing thoracolumbar, lumbar, or lumbosacral fusion for degenerative