The Spine Journal 19 (2019) 1566−1572

Clinical Study

Posterior lumbar fusions at physician-owned hospitals − is it time to reconsider the restrictions of the Affordable Care Act?

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Received 4 February 2019; revised 30 April 2019; accepted 1 May 2019

Abstract

BACKGROUND CONTEXT: Caused by perceptions regarding unnecessary healthcare resource utilization, high costs of care, and financial incentives towards "cherry-picking" cases in physician owned hospitals, the Affordable Care Act (ACA) of 2010 imposed restrictions on existing physician-owned hospitals from expanding. Despite an increasing number of individuals requiring access to spine surgical care, no study has evaluated the surgical safety and costs of elective posterior lumbar fusions (PLFs) being performed in physician-owned vs. non-physician-owned hospitals.
PURPOSE: We assessed differences in 90-day costs and outcomes between patients undergoing elective 1- to 3-level PLFs at physician-owned hospitals vs. nonphysician-owned hospitals.
STUDY DESIGN: Retrospective cohort study of 2007 to 2014 100% Medicare claims database.
PATIENT SAMPLE: The 2007 to 2014 Medicare 100% Standard Analytical Files (SAF100) was queried using International Classification of Diseases 9th Edition (ICD-9) procedure code for patients undergoing elective 1- to 3-level PLFs (81.07, 81.08, and 81.62). The Medicare Hospital Compare database was used to identify provider codes for physician-owned hospitals. These provider codes were cross-referenced to identify records of patients receiving elective PLFs at these hospitals from the SAF100 database.
OUTCOME MEASURES: Ninety day complications, readmissions, emergency department (ED) visits, charges, and costs.
METHODS: Multivariate logistic and linear regression analyses were used to assess significant differences in 90-day complications, readmissions, charges and costs between the two groups.
RESULTS: A total of 6,679 (2.9%) patients received an elective PLF at a physician-owned hospital (N=39; 2.2%) whereas 225,090 (97.1%) received surgery at nonphysician-owned hospital (N=1,774; 97.8%). After controlling for age, gender, region, hospital factors (socio-economic status area, urban vs. rural location and volume) and Elixhauser co-morbidity index, undergoing surgery at physician-owned hospital was associated with lower odds of thromboembolic complications (OR 0.66 [95% CI 0.53−0.82]; p<.001), urinary tract infections (OR 0.87 [95% CI 0.79 −0.95]; p=.002) and renal complications (OR 0.52 [95% CI 0.43−0.63]; p<.001) within 90-days following the surgery. Patients undergoing PLFs at physician-owned hospitals vs. nonphysician-owned hospitals also had lower risk-adjusted inpatient charges (−$10,218), inpatient costs (−$2,302), 90-day charges (−$9,780) and 90-day costs (−$2,324). No significant differences were noted between physician-owned and nonphysician-owned hospitals with regards to 90-day wound complications (OR 1.08 [95% CI 0.94−1.22]; p=.279), pulmonary complications (OR 1.06 [95% CI 0.97−1.17]; p=.187), cardiac complications (OR 0.92 [95% CI 0.83−1.01]; p=.089), septic

FDA device/drug status: Not applicable.

Author disclosure: ***AM:*** Nothing to disclose; ***FP:*** Royalties: Nuvasive, Stryker, DePuy, Medtronic (amounts not disclosed); Stock Ownership: Nuvasive, Theracell, SI-Bone, Expanding Orthopaedics, Providence, CarboFix; ***JK:*** Nothing to disclose; ***EY:*** Grants: Morley Research Foundation (B); Spinal Kinetics (C); ***SK:*** Grants: Spinal Kinetics (C).

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https://doi.org/10.1016/j.spinee.2019.05.011

complications (OR 0.77 [95% CI 0.56−1.01]; p=.073), all-cause ED visits (OR 0.96 [95% CI 0.89−1.04]; p=.311), revision surgery (OR 1.09 [95% CI 0.72−1.59]; p=.653) and readmissions (OR 0.98 [95% CI 0.89−1.08]; p=.680).

CONCLUSION: Our results suggest that patients undergoing elective 1- to 3-level PLFs at physician-owned hospitals do not experience a greater number of complications and/or readmissions while having lower risk-adjusted charges and costs over the 90-day episode of care. The findings call on the need for revaluation/reconsideration of the ACAs restriction on the expansion of these physician-owned hospitals.

Keywords: Posterior lumbar fusions; Physician-owned hospitals; 90-day outcomes; Costs; Medicare; Affordable Care Act

Introduction

More than 250 hospitals across the United States are partially or completely owned by physicians [1]. By definition, a physician-owned hospital is "any hospital in which a physician or physicians have an ownership or investment interest" [2]. During the past decade, these physician-owned hospitals have been surrounded by controversy. Health policymakers have voiced concerns that the stake ownership of physicians practicing in these hospitals may translate into strong financial incentives toward driving up the costs of care by charging for additional hospital services, up-coding of patient co-morbidity status and un-necessarily utilizing healthcare resources [3−9]. Some critics have even gone as far as to suggest that physician-owned hospitals often create disparities and barriers to access of care by "cherry-picking" cases so as to avoid financial losses associated with taking care of complex sicker patients. In contrast, proponents of physician-owned hospitals claim that stake ownership in facility results in physician's taking a more critical administrative role toward enhancing the quality [10,11] and cost of care [12] in hopes of improving hospital metrics. It is interesting to note that majority of the research debating against physician-owned hospitals is based off studies on specialty hospitals [13], which actually only compose a small subset of all physician-owned hospitals nationally.

The introduction of the 2010 Affordable Care Act (ACA) placed a broad moratorium on the expansion of all current physician-owned facilities, irrespective of the percentage of ownership, and prohibited the creation of new ones [14,15]. Such restrictions were met with major resistance from physicians who advocated for better evidence to support/counter these measures given that the implementation of such sanctions were based off decade-old data coming from studies focused only on specialty hospitals [7]. Supporters of physician-owned hospitals have uniformly called for the need for more conclusive research employing comparative-effectiveness methods to understand outcomes and costs between physician-owned vs. nonphysician-owned hospitals across different surgical specialties. In response to this call, recently published research focusing on all physician-owned hospitals, has found that care provided in these facilities is in fact, neither costly nor inferior, to those provided in nonphysician-owned hospitals [13,16]. However, majority of the latter studies are based on unspecified hospital quality data or focus on specific surgeries, such as total joint arthroplasties.

By utilizing a national sample of Medicare beneficiaries, the current study was designed to assess differences in 90-day costs and outcomes between patients undergoing elective 1- to 3-level posterior lumbar fusions (PLFs) at physician-owned hospitals vs. nonphysician-owned hospitals. Given that there is as an increasing proportion of elderly individuals requiring spine care, understanding outcomes and costs associated with elective spine surgeries at physician owned hospitals vs. nonphysician owned hospitals will facilitate/drive discussion on the re-evaluation and/or expansion of physician-owned hospitals to increase access to care for all spine patients.

Materials and methods

Database and patient sample

The PearlDiver Database was used to query a national 100% sample of Medicare beneficiaries from 2007 to 2014 to answer our research objectives. The PearlDiver database, is a subscription-based and HIPAA-compliant proprietary research repository that houses datasets from multiple sources, such as National Inpatient Sample (NIS), Medicare 5% and 100% standard analytical files (SAF5 and SAF100), and Humana Administrative Claims (HAC) [17]. The datasets can be accessed through a remote secure network allowing users to query them using combinations of International Classification of Diseases 9th Edition procedure/diagnosis (ICD-9-P, ICD-9-D) codes, Current Procedural Terminology codes and Diagnosis Related Groups. Because data retrieved from the PearlDiver database is presented in a deidentified format, the study was exempt from Institutional Review Board approval.

The 2007 to 2014 Medicare SAF100 database was queried using ICD-9-P codes for patients undergoing elective 1- to 3-level PLFs (81.07, 81.08, and 81.62) for degenerative lumbar pathology (Appendix). Patients undergoing anterior fusions, combined anterior-posterior fusions, cervical fusions and/or fusion for deformity, trauma and/or malignancy were excluded. Only those patients who underwent a primary PLF were included, with revision cases

being removed from the study cohort. The Medicare Hospital Compare dataset (available at https://data.medicare.gov/data/hospital-compare) was used to identify and retrieve Medicare Provider IDs of all physician-owned hospitals. The Medicare Hospital Compare dataset defines a hospital as being physician-owned as "a hospital in which a physician, or an immediate family member of a physician, has an ownership or investment interest may be through equity, debt, or other means, and includes an interest in the entity that holds an ownership or investment interest in the hospital." The Provider IDs of these physician owned hospitals were then used to filter for and identify patients receiving a 1- to 3-level PLF at one of these facilities in the main dataset. Zip codes from each hospital were used to categorize patients receiving surgery at a hospital that was located in an urban or rural location based on the 2010 US Census data [18]. Hospital zip codes were also used to identify whether the facility was located in a low socioeconomic status (SES) area according to 2014 past 5-year estimates data from US Census (median household income ≤ national quintile=$36,250) [19]. Hospital volume was arbitrarily defined into two groups: high volume (≥30 1- to 3-level PLFs/year) and low volume (<30 1- to 3-level PLFs/year). Other relevant data retrieved from the dataset included age, gender, region, year of surgery, and Elixhauser co-morbidity index (ECI) of patients.

Outcomes and cost data

Outcomes that were assessed as part of the study included occurrences of wound complications, pulmonary complications, cardiac complications, thromboembolic complications, septic complications, urinary tract infections, renal complications, all-cause emergency department (ED) visits, revision surgery, and readmissions occurring within 90 days of the surgery. Relevant codes used to retrieve the abovementioned complications can be found in the Appendix. We also retrieved inpatient-only and 90-day charges and costs to carry out a comprehensive cost-analysis between PLFs performed at physician-owned vs. nonphysician-owned hospitals.

Statistical analysis

Pearson–Chi square tests were used to assess for significant differences in baseline demographic and clinical characteristics between patients receiving surgery at physician-owned vs. nonphysician-owned hospitals. Descriptive analyses of hospitals (with regard to number of facilities in rural location, low SES area and high volume) have also been reported. Multivariate logistic regression analyses were used to assess the independent impact of hospital type (physician-owned vs. nonphysician-owned) on 90-day complications, revisions and readmissions while controlling for age, gender, region, hospital factors (urban vs. rural area, high vs. low SES location, and hospital volume) and ECI. Multivariate linear regression analyses, adjusting for the same before-mentioned covariates, were used to assess the independent marginal cost-impact (increase/decrease) of inpatient and 90-day charges and costs following surgery at a physician-owned vs. nonphysician-owned hospital. For all statistical purposes, a p-value of less than .05 was considered significant. Results from multivariate logistic regression models have been reported as adjusted odds ratio (OR) and 95% confidence intervals (CI). Results from multivariate linear regression models (for costs), have been reported as adjusted marginal-cost impacts (increase/decrease in US dollars) along with p-values. All statistical analysis was carried out using R-statistics through the PearlDiver research interface.

Results

A total of 6,679 (2.9%) patients received an elective PLF at a physician-owned hospital (N=39; 2.2%) whereas 225,090 (97.1%) received surgery at nonphysician-owned hospital (N=1,774; 97.8%). Patients undergoing PLF surgery at physician-owned hospitals were somewhat younger and had a slightly lower comorbidity burden (physician-owned ECI=6.5 vs. nonphysician-owned ECI=6.9). However, although these differences were statistically significant because of the large sample size, a difference of 0.4 in the means of the ECI between the two groups is likely not clinically significant. Majority of the patients undergoing PLFs at physician-owned hospitals vs. nonphysician-owned hospitals were from the South (69.0% vs. 43.6%) and Midwest (27.2% vs. 25.6%). Over 50% of PLFs being performed at a physician-owned hospital were at a high-volume facility. In contrast, only 33% of the PLFs being performed at nonphysician-owned hospitals were at high-volume hospital. A complete description of baseline clinical characteristics can be found in Table 1.

With regard to hospital-level factors, 28 (71.8%) of physician-owned hospitals vs. 1,024 (57.7%) of nonphysician-owned hospitals were situated in a rural location. A total of 5 (12.8%) of physician-owned hospitals were in a low SES area as compared with 333 (18.8%) of nonphysician-owned hospitals. Nearly 18% (N=7) of all physician-owned hospitals were high-volume facilities where as only 9% (N=162) of all nonphysician-owned hospitals were high-volume (Table 2).

Unadjusted rates of 90-day complications, revisions, and readmissions can be found in Table 3. Following adjustment for differences in age, gender, region, hospital factors (socio-economic status area, urban vs. rural location and volume) and ECI, patients undergoing PLF at physician-owned hospital vs. nonphysician-owned hospital had significantly lower odds of 90 day thromboembolic complications (1.3% vs. 2.3%, OR 0.66 [95% CI 0.53–0.82]; p<.001), urinary tract infections (8.3% vs. 10.1%, OR 0.87 [95% CI 0.79–0.95]; p=.002) and renal complications (1.7% vs. 3.6%, OR 0.52 [95% CI 0.43–0.63]; p<.001)

Table 1
Baseline clinical characteristics of physician-owned and non-physician-owned hospitals

	Physician-owned hospital	Nonphysician-owned hospitals	p-value
Number of hospitals (%)	39 (2.2%)	1,774 (97.8%)	–
Number of patients (%)	6,679 (2.9%)	225,090 (97.1%)	–
Age (years)			<.001
<65	1,576 (23.6%)	51,037 (22.7%)	
65–69	1,962 (29.4%)	61,833 (27.5%)	
70–74	1,578 (23.6%)	51,441 (22.9%)	
75–79	983 (14.7%)	35,536 (15.8%)	
80–84	428 (6.4%)	17,160 (7.6%)	
>84	77 (1.2%)	5,168 (2.3%)	
Unknown	75 (1.1%)	2,915 (1.3%)	
Gender			.307
Female	4,120 (61.7%)	137,364 (61.0%)	
Male	2,484 (37.2%)	84,811 (37.7%)	
Unknown	75 (1.1%)	2,915 (1.3%)	
Region			<.001
Midwest	1,818 (27.2%)	57,515 (25.6%)	
Northeast	38 (0.6%)	29,860 (13.3%)	
South	4,609 (69.0%)	98,222 (43.6%)	
West	214 (3.2%)	39,487 (17.5%)	
Unknown	0 (0%)	<11 (<0.1%)	
Year			<.001
2007	816 (3.0%)	26,513 (97.0%)	
2008	813 (2.8%)	28,174 (97.2%)	
2009	792 (2.5%)	30,508 (97.5%)	
2010	806 (2.4%)	32,201 (97.6%)	
2011	926 (2.9%)	30,711 (97.1%)	
2012	989 (3.1%)	31,159 (96.9%)	
2013	938 (3.1%)	29,224 (96.9%)	
2014	599 (3.5%)	16,600 (96.5%)	
Hospital location			<.001
Urban	2,175 (32.6%)	107,244 (47.6%)	
Hospital in low SES area (median ZIP-based household income ≤ national quintile)	489 (7.3%)	54,273 (24.1%)	<.001
High volume hospital (≥30 1-to-3 level PLFs/year)	3,676 (55.0%)	75,125 (33.0%)	<.001
Elixhauser Comorbidity Index (ECI)	6.5±3.9	6.9±4.1	<.001

Table 2
Descriptive analysis of hospital-level factors

Hospital-level factors	Physician-owned hospitals	Nonphysician owned hospitals	p-value
Number of hospitals (%)	39 (2.2%)	1,774 (97.8%)	–
Location			.078
Rural	28 (71.8%)	1024 (57.7%)	
Urban	11 (71.8%)	750 (42.3%)	
Low SES area (median ZIP-based household income ≤ national quintile)	5 (12.8%)	333 (18.8%)	.345
High volume (≥30 1-to-3 level PLFs/year)	7 (17.9%)	162 (9.1%)	.061

(Table 4). No significant differences were noted between PLFs at physician-owned and nonphysician-owned hospitals with regards to wound complications (OR 1.08 [95% CI 0.94–1.22]; p=.279), pulmonary complications (OR 1.06 [95% CI 0.97–1.17]; p=.187), cardiac complications (OR 0.92 [95% CI 0.83–1.01]; p=.089), septic complications (OR 0.77 [95% CI 0.56–1.01]; p=.073), all-cause ED visits (OR 0.96 [95% CI 0.89–1.04]; p=.311), revision surgery (OR 1.09 [95% CI 0.72–1.59]; p=.653) and readmissions (OR 0.98 [95% CI 0.89–1.08]; p=.680) (Table 4).

Patients undergoing PLFs at physician-owned hospitals vs. nonphysician-owned hospitals also had lower risk-adjusted inpatient charges (−$10,218), inpatient costs (−$2,302), 90-day charges (−$9,780), and 90-day costs (−$2,324) (Table 5).

Discussion

Despite the long-standing controversy and speculations surrounding the effectiveness of physician-owned hospitals, few studies have explored the long-term outcomes and costs associated with an entire episode of care associated with undergoing surgery at such physician-owned facilities and compared it to a nationally relevant population of patients at nonphysician-owned hospitals. Using a national administrative dataset of Medicare beneficiaries, the findings of the study show that elective 1- to 3-level PLFs at physician-owned hospitals do not have worse outcomes. Furthermore, surgeries done at physician-owned hospitals have significantly lower risk-adjusted costs over the entire 90-day episode of care. As the current healthcare models transition toward adoption of value-based approaches to reduce costs and unnecessary healthcare resource utilization while maintaining access to quality care to all patients, the results of the study warrant a possible re-evaluation of the restrictions posed by the ACA on physician-owned hospitals.

Prior literature involving comparisons between physician-owned vs. nonphysician-owned hospitals is largely limited. In the orthopaedic literature, only two studies have evaluated the safety and cost-efficacy of physician-owned hospitals with regard to total joint arthroplasties. Lundgren et al. carried out a comprehensive analysis of all total joint arthroplasties carried out in physician-owned and other acute-care hospitals across the state of Pennsylvania [11]. The authors noted that physician-owned hospitals had higher patient satisfaction scores, while having similar readmissions and complication rates as compared with nonphysician-owned hospitals. However, the study also observed that whereas physician-owned hospitals had higher costs of care across the entire episode of care, the

Table 3
Unadjusted rates of 90-day outcomes between the two groups

	Physician-owned hospitals	Nonphysician-owned hospitals	p-value
Wound complications	256 (3.8%)	9,084 (4.0%)	.424
Pulmonary complications	527 (7.9%)	18,388 (8.2%)	.425
Cardiac complications	491 (7.4%)	19,553 (8.7%)	<.001
Thromboembolic complications	90 (1.3%)	5,244 (2.3%)	<.001
Septic complications	47 (0.7%)	6,632 (2.9%)	.004
Urinary tract infections	552 (8.3%)	22,724 (10.1%)	<.001
Renal complications	112 (1.7%)	8,013 (3.6%)	<.001
All-cause ED visits	839 (12.6%)	30,524 (13.6%)	.020
Revision surgery	26 (0.4%)	872 (0.4%)	.999
Readmissions	516 (7.7%)	19,665 (8.7%)	.004

Table 4
Adjusted 90-day outcomes between physician-owned hospitals vs. nonphysician-owned hospitals. Reference taken as "Nonphysician-Owned Hospitals"

Outcome	Adjusted OR [95% CI]	p-value
Wound complications	1.06 [0.93–1.21]	.344
Pulmonary complications	1.06 [0.96–1.16]	.241
Cardiac complications	0.92 [0.84–1.02]	.105
Thromboembolic complications	0.66 [0.53–0.81]	**<.001**
Septic complications	0.77 [0.57–1.02]	.081
Urinary tract infections	0.87 [0.79–0.95]	**.002**
Renal complications	0.52 [0.43–0.63]	**<.001**
All-cause ED visits	0.96 [0.89–1.04]	.321
Revision surgery	1.09 [0.71–1.58]	.676
All-cause readmissions	0.97 [0.88–1.07]	.592

proportion of money paid on postacute care was significantly lower as compared with nonphysician-owned hospitals. In another comprehensive analysis of Medicare beneficiaries undergoing total joint arthroplasties (TJAs) using the Center for Medicare and Medicaid Services (CMS) Inpatient charge data, Courtney et al. found that physician-owned hospitals outperformed nonphysician-owned hospitals with the former having lower inpatient costs of care, fewer complications, and higher patient satisfaction scores [16].

By focusing our objectives on highly relevant and specific population of Medicare patients undergoing elective 1- to 3-level PLFs, the findings of our study also give support to the conclusions of prior research revolving around the safety and cost-efficiency of physician-owned hospitals. Without granular hospital-level data that are not available in administrative claims datasets, it is difficult to fathom as to why PLFs at physician-owned hospitals are more efficient with regard to lower costs and have lower medical complications as compared with nonphysician-owned facilities. Past studies may argue that our observations are reflective of geographic variability and lower costs of care in the South [20], however it is important to reiterate that we controlled for these possible confounding factors in our analyses. The lower costs of care at physician-owned hospitals also cannot be explained by comorbidity status of patients alone. The average ECI comorbidity burdens were clinically similar and nonsignificant in both groups (Table 1), and furthermore these ECI scores were also controlled for in the regression model to provided risk-adjusted marginal cost-impacts. Regardless, readers must acknowledge that such administrative datasets lack enough granular details, with regard to the severity of comorbidities, making it difficult to ascertain whether there indeed was a "selection bias" toward "cherry-picking" patients with less severe comorbidities which may be responsible for the lower rate of medical complications and/or costs observed. For instance, providers at physician-owned hospitals may preferentially prefer operating on diabetic individuals with lower HbA1C levels, and referring those with high HbA1Cs to nonphysician-owned hospitals. Unfortunately, for an administrative dataset, even though the before-mentioned groups of diabetic patients may have different severities at presentation, they still get coded with the same diabetes diagnosis code. It is also important to take into account that, in general, physician-owned hospitals are nonteaching hospitals that may not see a diverse payer mix of patients as compared with nonphysician-owned hospitals. Center for Medicare and Medicaid Services takes

Table 5
Comparison on Index Hospitalization costs, 90-day costs and length of stay between hospitals. Results have been adjusted for age, gender, region, ECI, location of hospital (urban vs. rural), whether hospital was in a low SES area and hospital volume

	Physician-owned hospitals	Nonphysician-owned hospitals	Risk-adjusted marginal cost of physician-owned hospitals	p-value
Inpatient charges	$72,178±$43,959	$85,658±$51,455	−$10,435±$624	**<.001**
Inpatient costs	$18,668±$7,124	$22,633±$8,634	−$2,232±$104	**<.001**
90-day charges	$83,690±$58,715	$98,817±$68,393	−$10,091±$829	**<.001**
90-day costs	$21,572±$11,336	$26,151±$13,707	−$2,278±$165	**<.001**

both of these factors into account when calculating payments, and it is possible that nonphysician-owned hospitals get paid more simply for this reason alone. Because both teaching status and payer mix are not reported in the Medicare dataset, it is difficult to control and account for these factors comprehensively.

The lower complication rates and costs could also be caused by better adherence to processes-of-care and/or evidence-based clinical pathways. Although no study has performed a root-cause analysis to identify the reasons for superior cost-efficiency and/or differences in complication rates in physician-owned hospitals, proponents of such facilities have long supported that stake ownership allows physicians to have a better hold over day-to-day administrative decision making and hospital governance powers. This may allow physicians to easily identify pitfalls and launch timely strategies to improve care. Past studies have noted that physician-owned surgical hospitals overtake nonphysician hospitals with regard to average CMS hospital star ratings [16] (the score of which is calculated using comprehensive analyses of mortality, safety/effectiveness of care, readmissions, and timeliness of care in a single facility) and patient satisfaction scores [11]. Caused by an increased involvement of physicians in the governance of care, it is not surprising that physician-owned hospitals also outperform other hospitals in implementation of value-based care delivery models [21]. With bundled payments gradually being adopted throughout the realm of spine surgeries, physician-owned hospitals will play a vital role in delivering high-value care to patients further supporting the need of a reconsideration of the ACA.

Critics of physician-owned hospitals have also routinely debated that physician ownership in a facility can indirectly incentivize them to use resource more regularly and unnecessarily in order to increase the overall profit of the hospital. Based on our observations, it appears that such a claim is untrue given that the inpatient and 90-day risk-adjusted charges (what the hospital reports and claims from Medicare) were approximately $10,000 lower as compared with nonphysician-owned hospitals. Advocates of physician-owned hospitals have also publicly expressed their opinion regarding this matter, further refuting the assertions [8].

There are several limitations to the study, which should be taken into context when integrating the results of the study with health policy. Firstly, administrative datasets, such as ours, are often prone to miscoding and billing errors. Administrative claims datasets also do not robustly account for granular clinical patient-level factors, such as functional status, the severity of comorbidities and/or patient reported outcomes. Although the larger sample size allows us to gather enough statistical power to detect significance in even small differences, health policy makers should not overlook the importance of understanding what differences/findings are truly clinically meaningful in order to best implement changes in policy and/or clinical practice. The use of ICD-9 codes prevents us from appropriately distinguishing individuals who received posterior vs. a transforaminal lumbar interbody fusion. It is possible that different approaches used by different surgeons may implicate postoperative resource utilization. Administrative databases also lack the capability of identifying which individuals received a minimally invasive surgery vs. an open procedure. The Medicare dataset also does not hold information with regard to certain hospital-level factors, such as bed size, teaching status, payer mix, and nurse staffing ratio that would have been useful to control for the analysis. The Hospital Compare dataset also does not provide information on the variety of other surgical and medical specialties available at such physician-owned hospitals. National Provider Identification numbers are also not provided in the PearlDiver dataset, which prevents us from reporting average surgeon volume at physician-owned hospitals. Lastly, though we used a comprehensive national dataset of Medicare beneficiaries, the results may not be extrapolated to a private payer population that commonly presents at such physician-owned hospitals.

In conclusion, by analyzing a large cohort of over 230,000 patients undergoing elective 1- to 3-level PLFs at more than 1,800 hospitals across the United States, our results suggest that patients undergoing these procedures at physician-owned hospitals are not at a higher risk of experiencing complications and, furthermore, have fewer risk-adjusted charges and costs over the 90-day episode of care. The findings call into the need for revaluation/reconsideration of the ACAs restriction on the expansion of these physician-owned hospitals.

Supplementary materials

Supplementary material associated with this article can be found in the online version at https://doi.org/10.1016/j.spinee.2019.05.011.

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